PAINT and VARNISH Production

THE TECHNICAL MAGAZINE FOR MANUFACTURERS OF PAINT, VARNISH, LACQUER AND OTHER SYNTHETIC FINISHES

JUNE
1956

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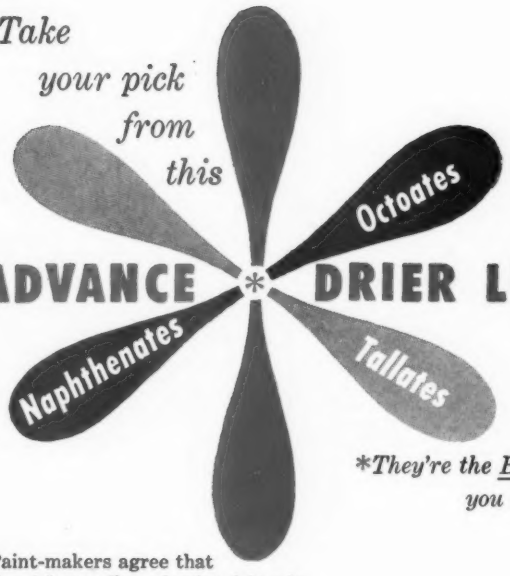

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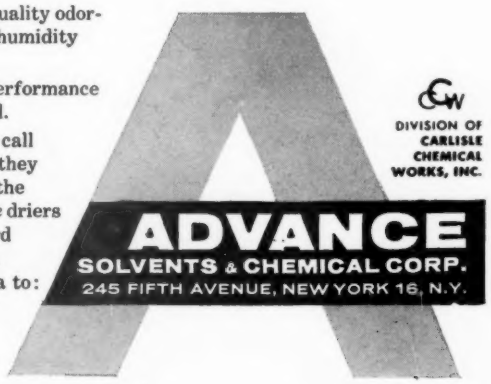

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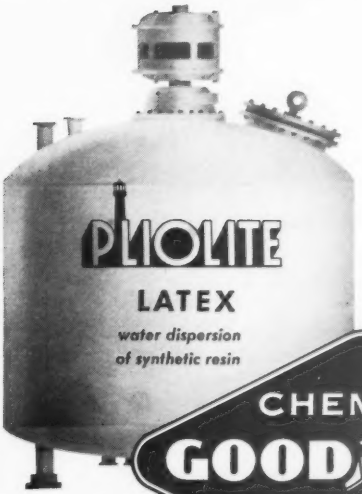

Pictured above is the beginning of a new service to you from Goodyear. It's a *Tech Book for the Paint Industry* – a compilation of technical information on raw materials manufactured by the Chemical Division for use in paints.

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VOL. 46 JUNE, 1956 NO. 7

NEXT ISSUE

Many plastic articles require coatings to obtain improved functional properties and improved appearance. The coating of molded plastic objects often presents difficulties of softening or etching of the surface by solvents, poor adhesion, or plasticizer migration.

In the July issue we are pleased to present a paper describing lacquer formulations which give good performance on difficult-to-coat plastics such as cellulose acetate, polystyrene, phenolics, and Mylar when applied by conventional spraying techniques.

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Editorial Comment

June, 1956

Automation for the Small Plant

THERE are many who are of the opinion that the only place automation can work is in the big plant. This is understandable since automation made its first appearance in the big industries, such as the automotive, metal-working and chemical fields.

In recent months we have witnessed the successful application of automatic techniques and instrumentation to those processing industries which utilize batching methods. Among these have been linoleum, coated fabrics, rubber and insulation products, etc.

In all cases, the advantages gained through automatic batching included better product uniformity, higher production output, lower operating costs, savings in manpower, improved yield, better production flexibility, elimination of manual handling of deleterious materials, and improved employee-employer relations.

In view of the fact that the manufacturing operations of the above industries are very similar to that of paint processing, it behooves the paint industry, as a whole, to investigate the advantages of utilizing automatic techniques and instrumentation. A concrete example of the application of automation and instrumentation is discussed in detail in a feature article of this issue under the title, "Automatic Batching." We urge you to read it!

Have You Considered Statistics?

THE growing importance of statistics in the various phases of scientific endeavors is attested to by the numerous talks, panel discussions, and publication of papers appearing in the various technical journals during recent months. Those connected with scientific research, especially testing and evaluation, have found the use of statistical procedures a great asset in analyzing experimental data objectively. More important, they have found that statistical procedures are capable of effecting great economies in the various fields of research.

However, one of the basic problems confronting those contemplating the utilization of statistics in research work is the lack of understanding of statistics amongst scientific people, and more important, what these statistics can do.

In many instances, and this is particularly true of large research laboratories, the services of an experienced statistician are used to help the research worker to design experiments in order that he may get the maximum amount of information for a given amount of effort. In addition, the statistician can materially help the experimenter to obtain a true picture of experimental errors—an important consideration in evaluating raw materials and determining quality of finished products.

It is realized, of course, that in the small laboratory which is characteristic of most paint plants, it would be beyond the budgetary limits of most firms to hire a trained statistician to work with laboratory personnel. Thus, the logical approach would be to train key laboratory individuals in the various phase of statistical procedures.

This may be accomplished by holding scheduled seminars within the company on the subject or having such individuals attend a short course in statistics (of which there are many) designed to meet the needs of researchers and experimenters.

In recognition of the interest that is being generated concerning the use of statistics in coatings, the Gordon Research Conference on Organic Coatings, scheduled July 16-20th at New Hampton, N. H., will hold a one day's session on this vital subject. H. B. Wagner of Rutgers University will present a paper entitled, "The Statistical Approach to Coatings Problems" and also scheduled on the program will be a panel discussion on "Case Histories of Statistics Applied in Coatings."

In view of the fact that the main functions of the average paint laboratory are testing and evaluation, and since it is quite evident that statistics, if used judiciously, can be a tremendous asset to the experimenter, why not look into the possibilities of getting your laboratory people statistically-minded.

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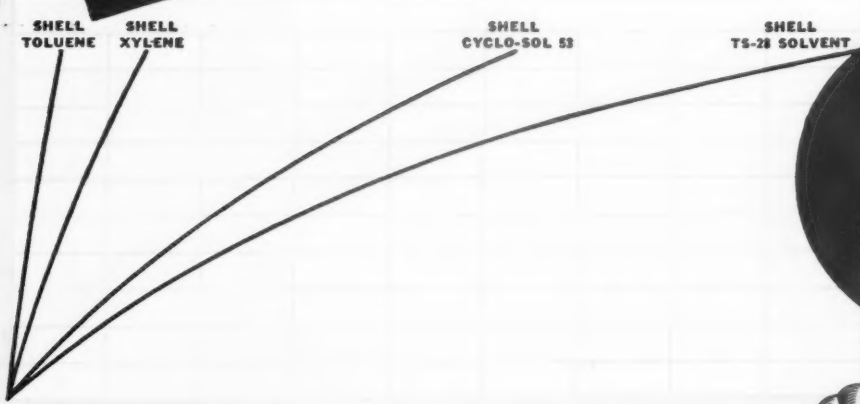

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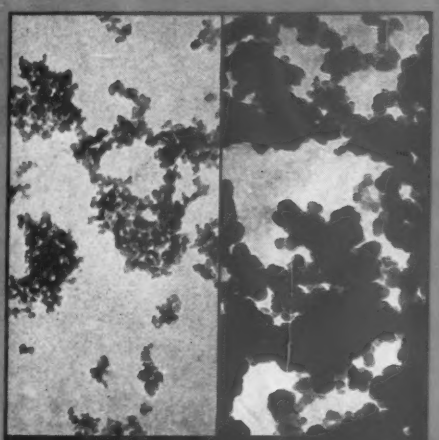
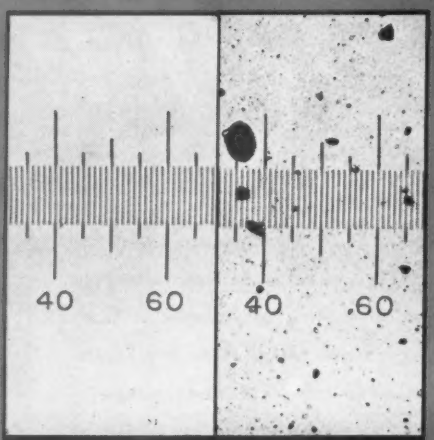


Electron micrographs contrast Columbian color black particles (left) with less jet rubber black (right). Same magnifications. 50,000 X

2. Dispersion

Even the finest color blacks will not give full jetness unless they are completely dispersed. If you can see aggregates of carbon particles with a light microscope the dispersion is not good enough.



These light micrographs show a perfect Columbian dispersion (left) and poorly dispersed particles (right). Same magnifications. *Each scale division represents 7.04 microns.*

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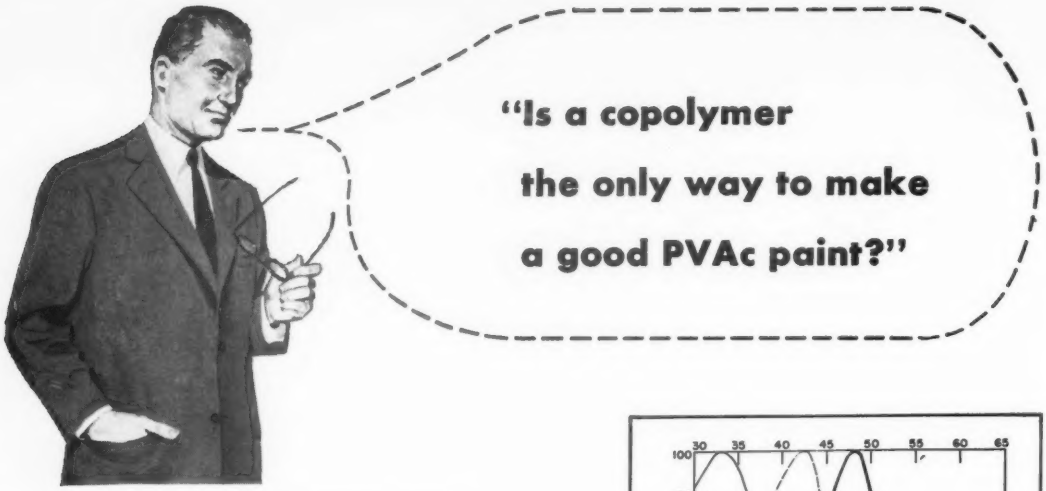
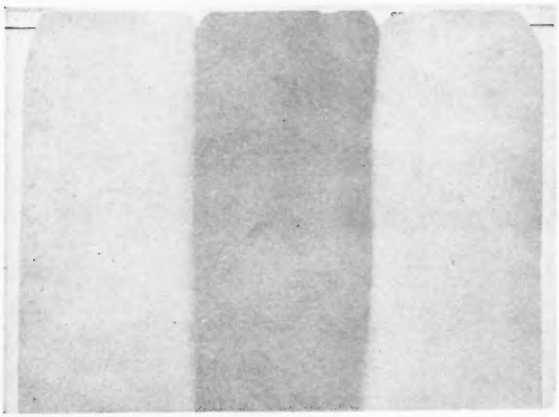
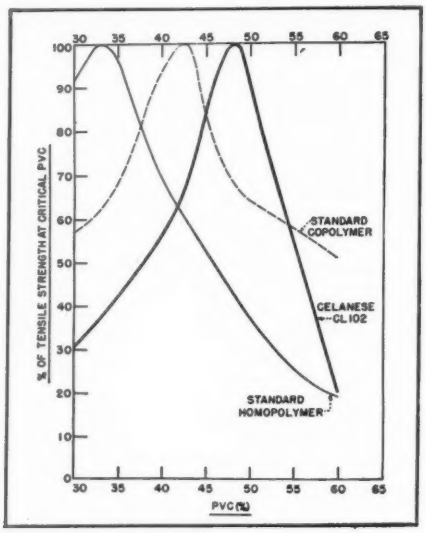


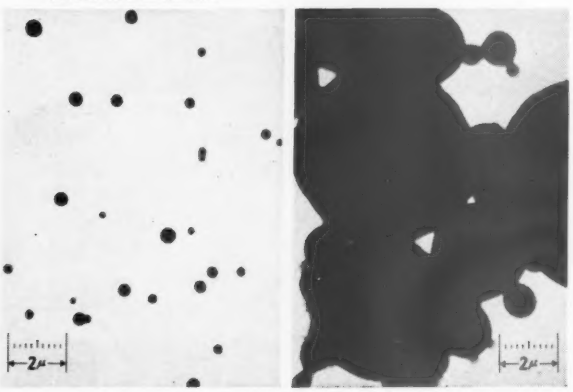


STANDARD HOMOPOLYMER CELANESE CL-102 STANDARD COPOLYMER

SUPERIOR PIGMENT WETTING. The three paints above were made on the same formula and tinted with equal amounts of an aqueous carbon black dispersion. Full color development was obtained in the CL-102 based paint, whereas flocculation occurred in the paints made with the standard homopolymer and copolymer. This demonstrates the extent to which the emulsifiers present in CL-102 aid in the dispersion of pigments thus providing an extra margin of safety against flocculation difficulties.

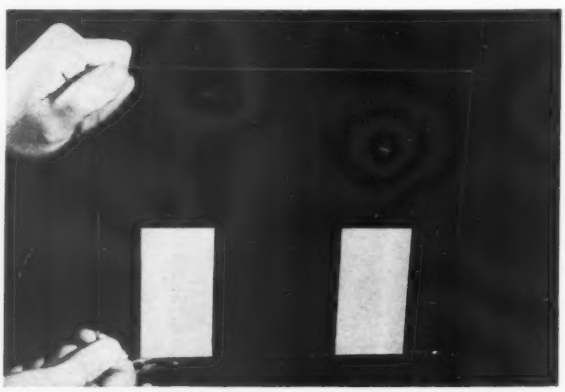


HIGH PIGMENT BINDING. Celanese emulsions are designed as paint vehicles. Because of this they exhibit extremely high pigment binding capacity. The above graph was prepared by plotting the tensile strength of paint films at progressively higher PVC's. A standard formulation was used and only the emulsions differed. In this comparison, Celanese CL-102 exhibited a critical PVC even higher than the standard copolymer emulsion shown.



CELANESE CL-102 STANDARD HOMOPOLYMER

FINE PARTICLE SIZE. One of the more important reasons for the superior properties of Celanese CL-102 is its extremely fine particle size. This contributes to higher pigment binding, better non-settling characteristics, and tighter, more completely coalesced films.



STANDARD HOMOPOLYMER CELANESE CL-102 STANDARD COPOLYMER

SUPERIOR WATER RESISTANCE. Pictured above are three drawdowns of unpigmented PVAc films. (Both homopolymers plasticized with DBP.) The films were dried 72 hrs., then immersed in water for 5 min. The CL-102 film in the center maintains its crystal clear appearance and is substantially unaffected by the water.

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- **Inherent flexibility—requires less external plasticizer**
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- **Crystal-clear, water-resistant films**
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- **Superior pigment wetting ability and color development**
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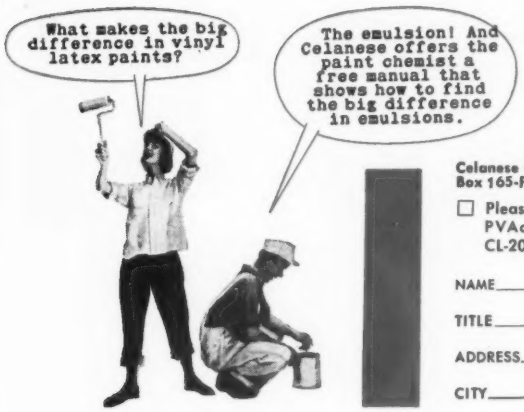
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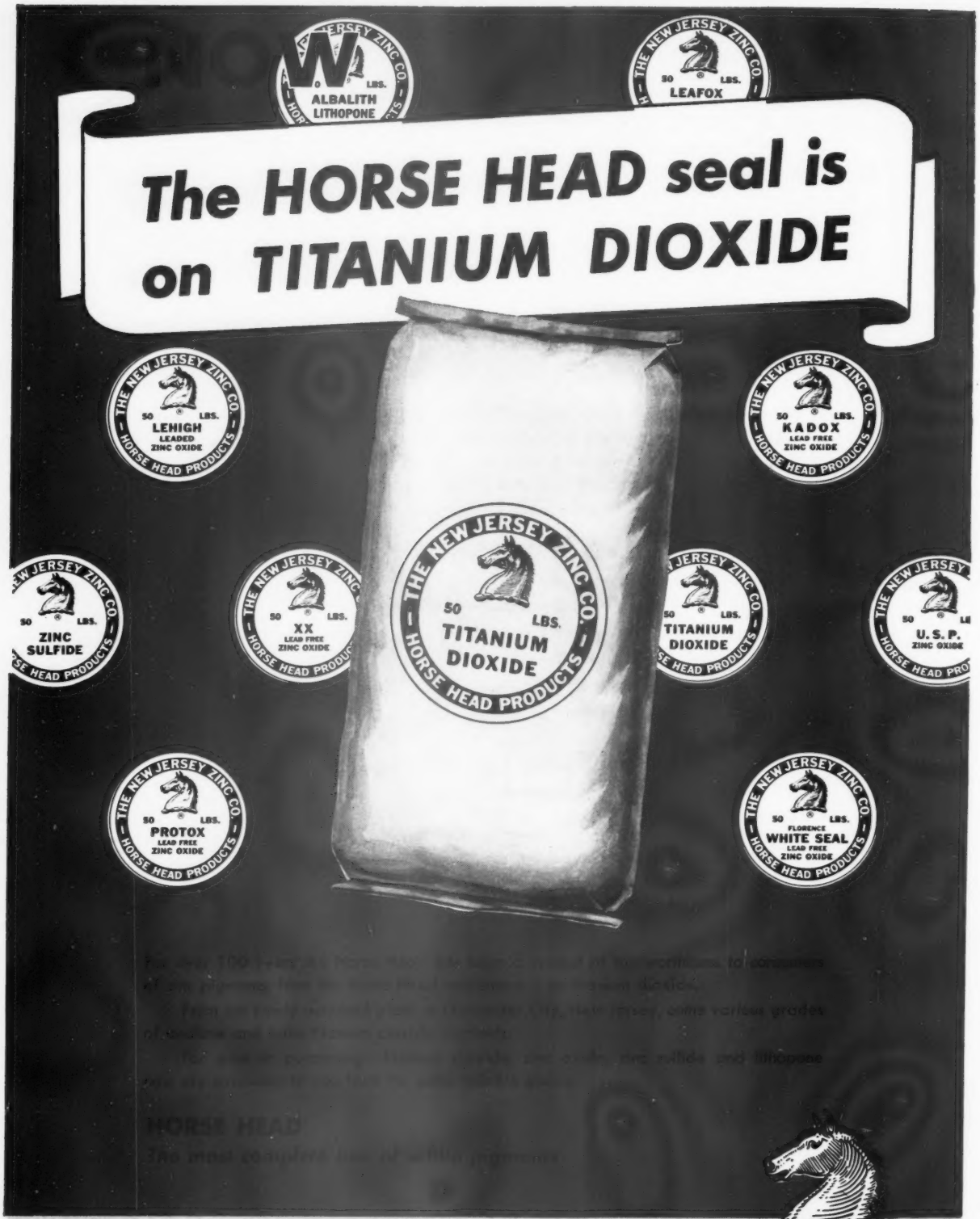
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ZINC SULFIDE
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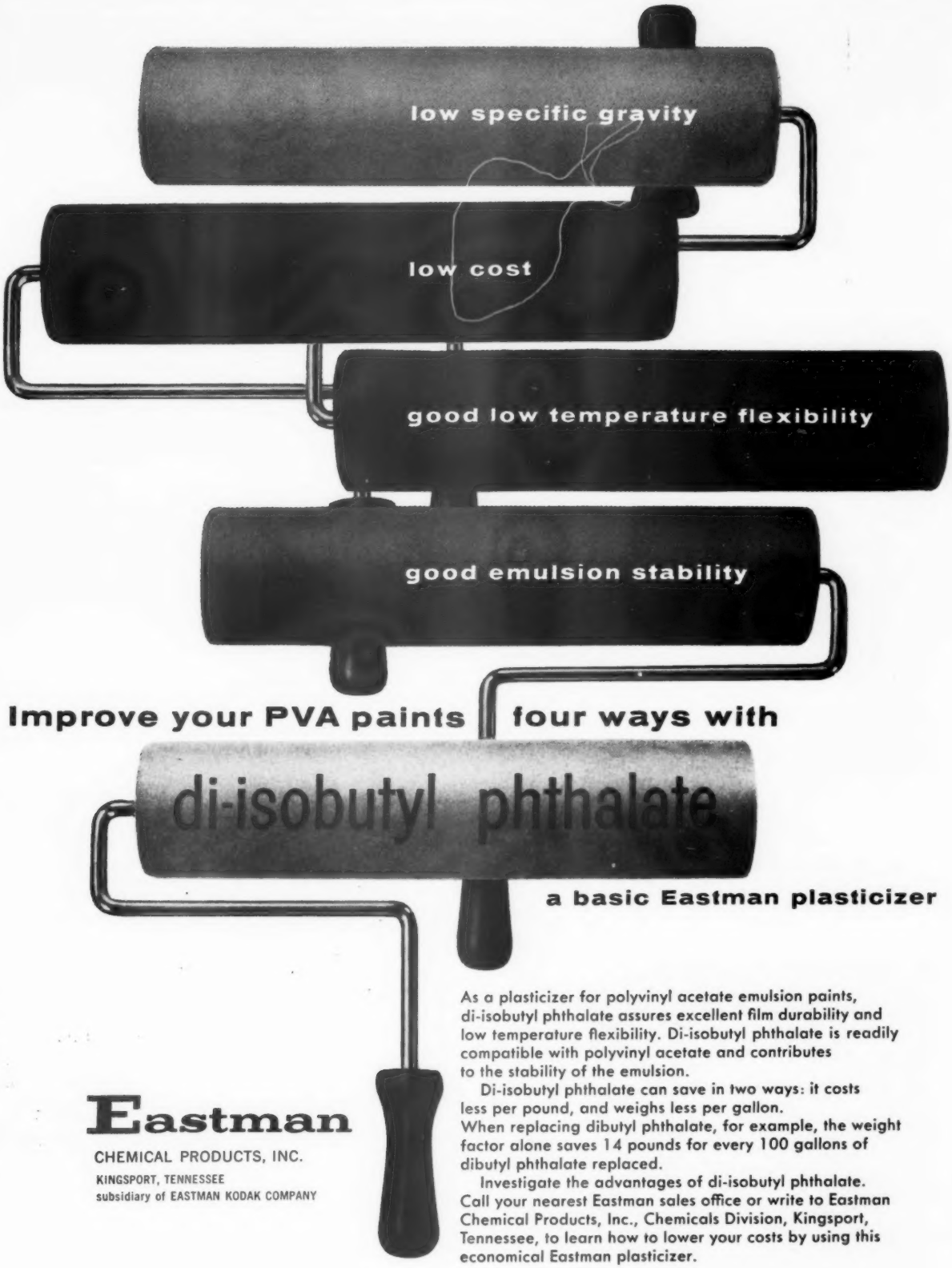

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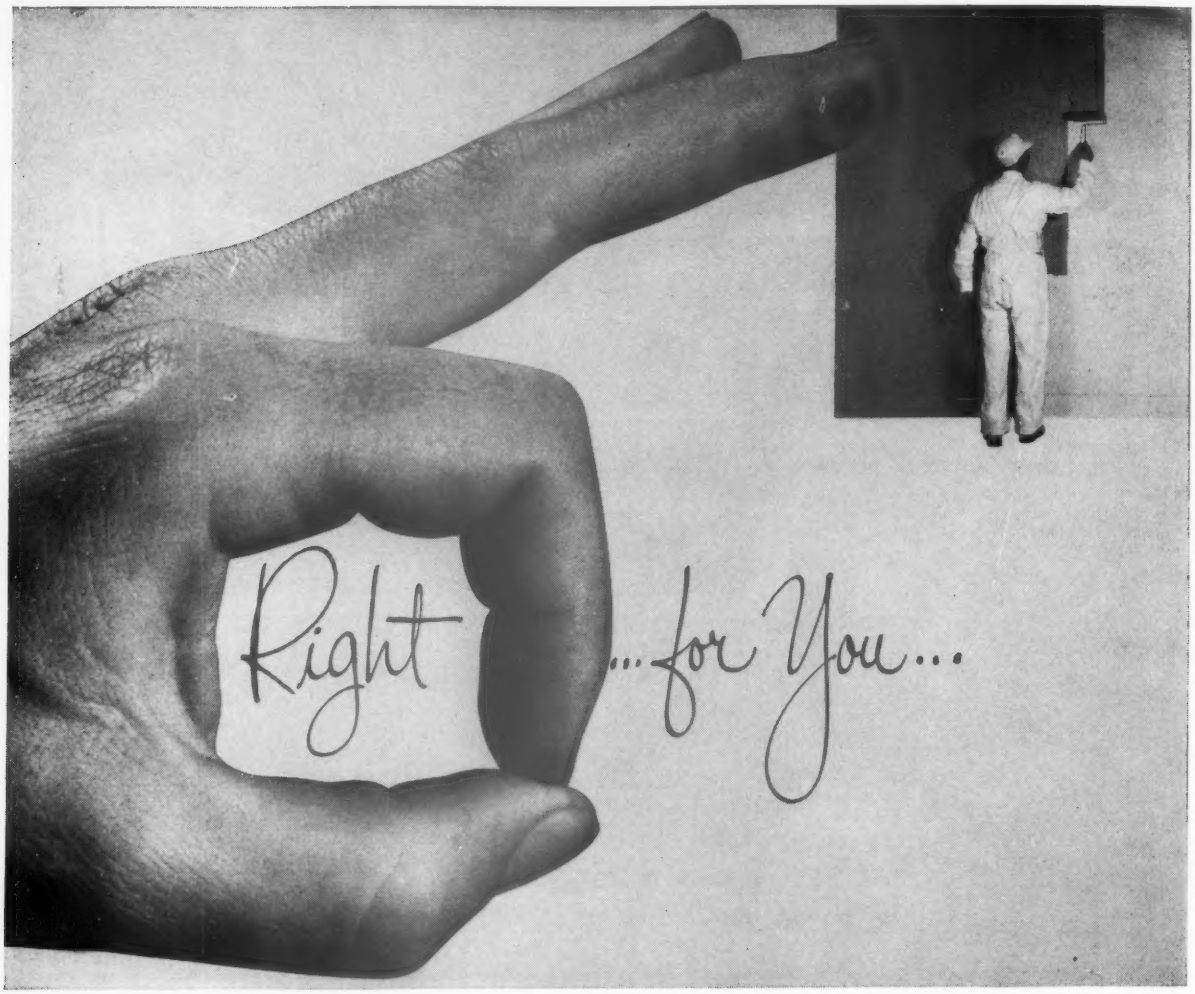

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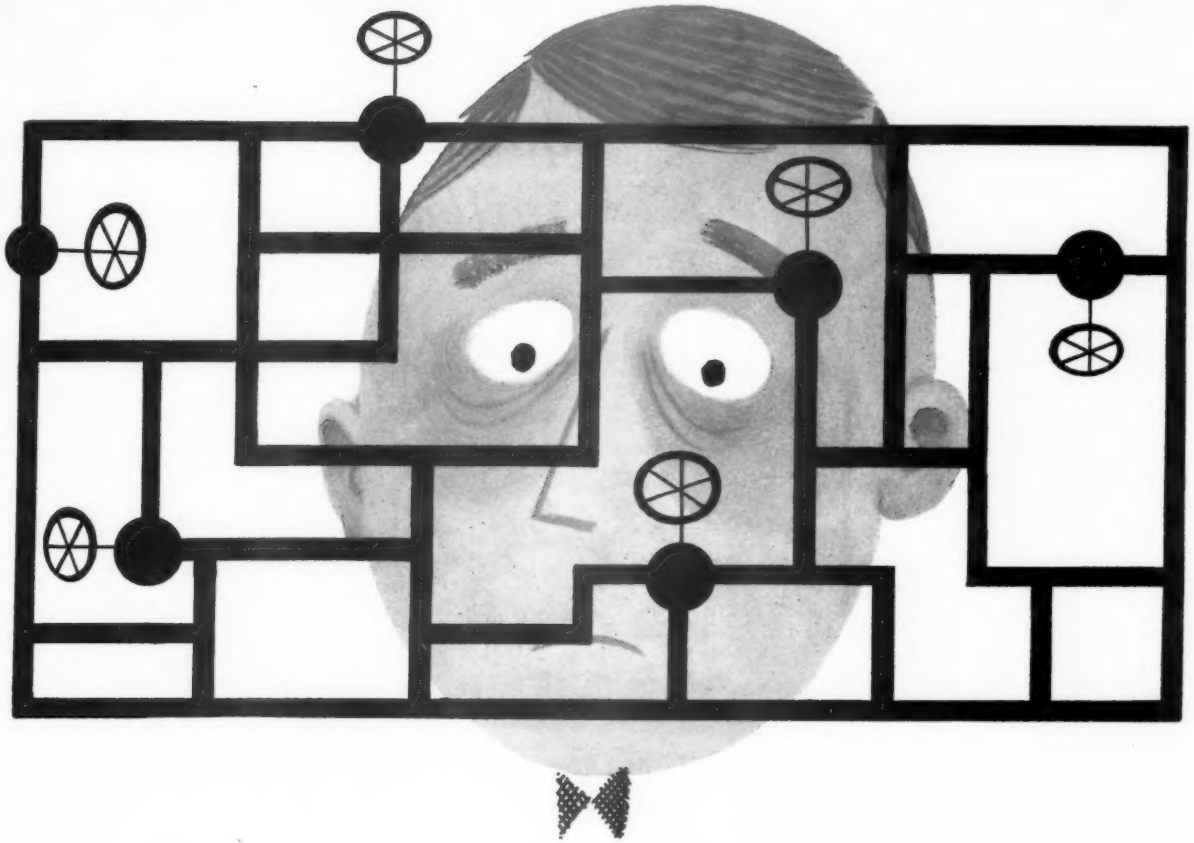

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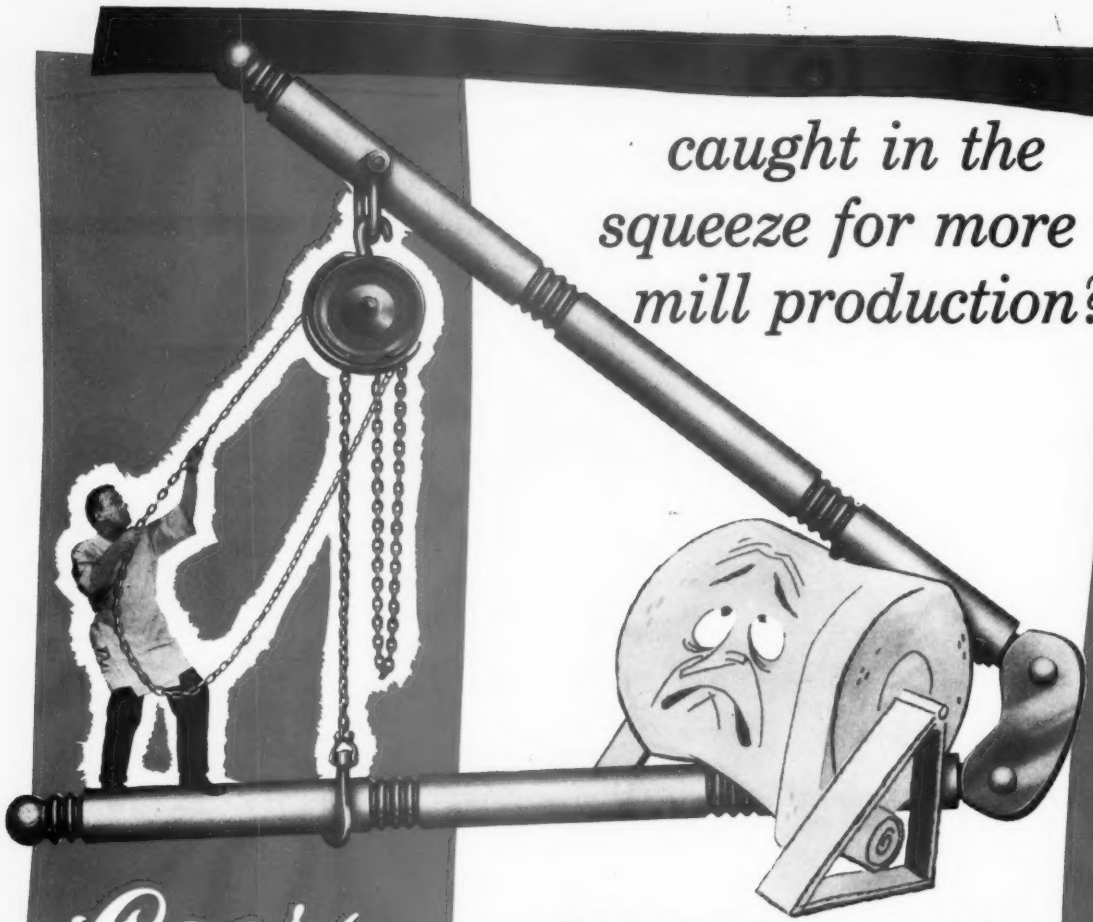

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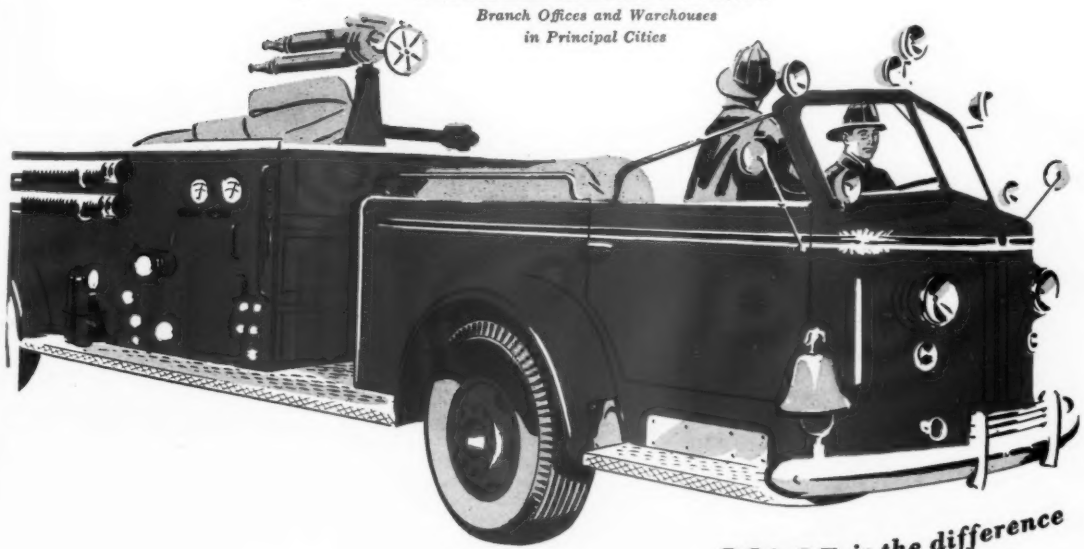

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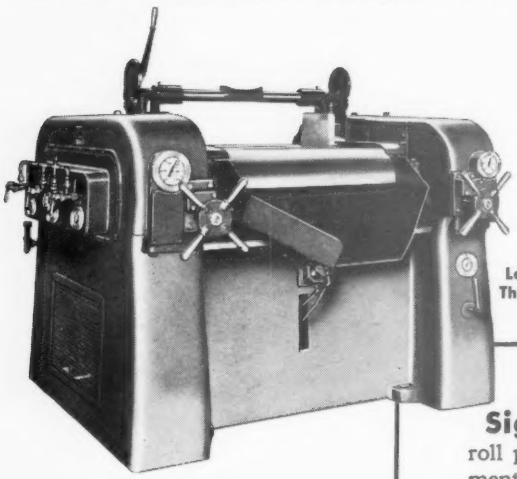

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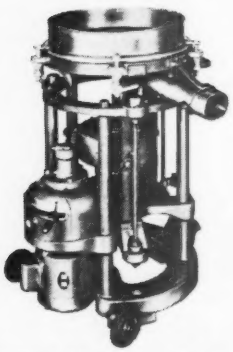

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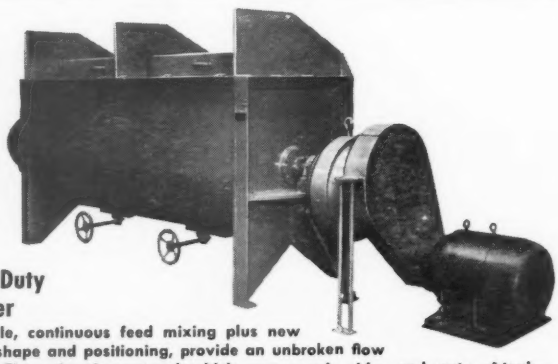

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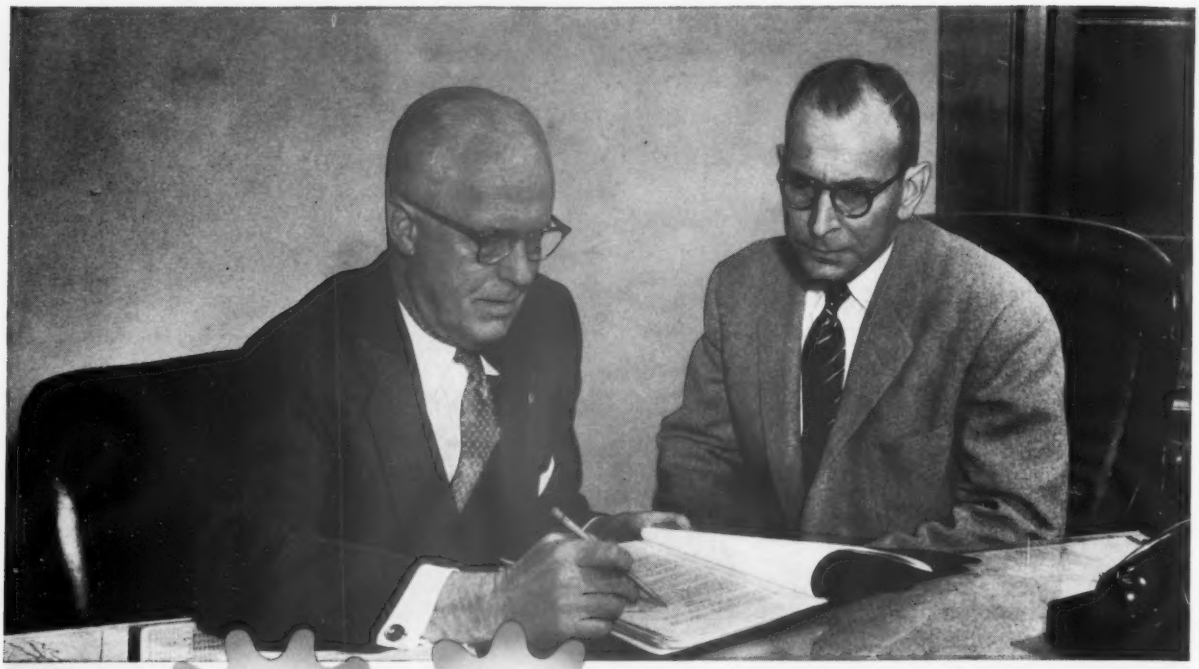

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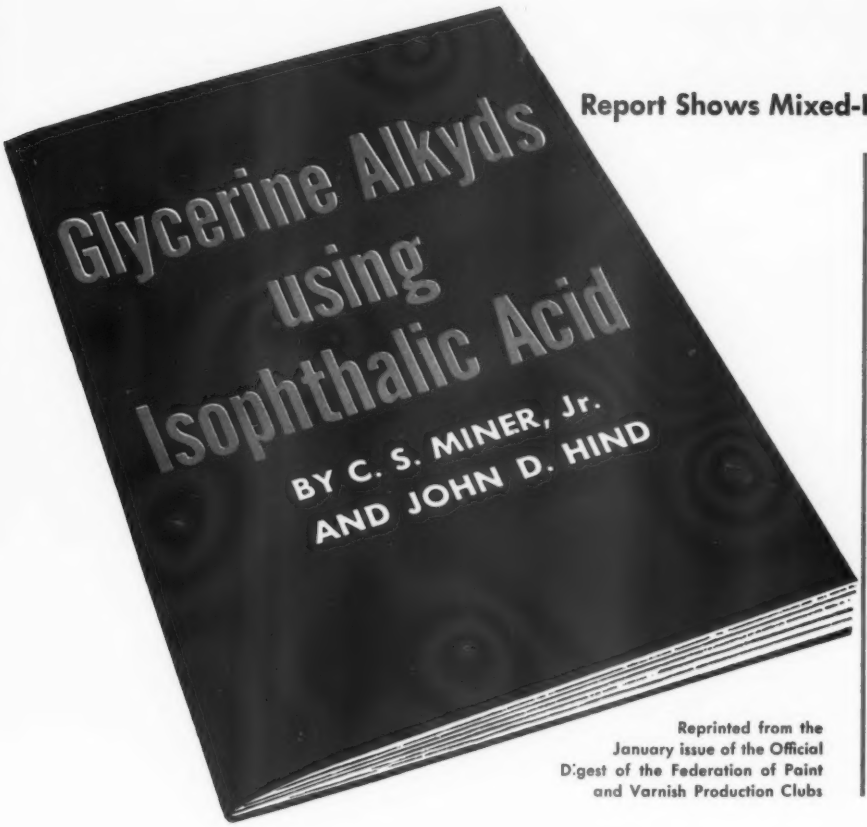

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ACRYLONITRILE IN SURFACE COATINGS

By
Dr. J. C. Pullman*

ABSTRACT

Acrylonitrile produces certain favorable mutations in the film properties of many surface coating compositions. Among these improvements are increased hardness, toughness, solvent resistance, and tensile strength, and decreased drying time, elongation, water absorption, and saponifiability (10).

The discussion which follows points out the manner in which these improved properties have been utilized in specific applications in the surface coatings industry. These applications have been limited arbitrarily to the use in paints, drying oils, and miscellaneous protective coatings for metal and wood, in addition to the use of acrylonitrile derivatives as curing agents for epoxy resins and as solvents.

ACRYLONITRILE is becoming increasingly useful in surface coating formulations. Films which contain acrylonitrile as part of the copolymer are tougher, dry faster, and are less subject to chemical attack.

Resins for use in paints benefit greatly from these properties. Acrylonitrile in styrenated alkyds improves their solvent resistance, and also reduces drying time and increases viscosity (11,24). One commercially-available resin of this type, Cycopol[R] Resin 320-5 (4), air dries with lacquer speed, bakes hard in a very short time, and is especially useful where marproofness and chemical inertness are prime factors. Copolymers of acrylonitrile with vinylidene chloride (Saran F122A20) (16) or ethyl acrylate (1) also produce improved paint films.

* Dr. J. C. Pullman is Manager of Technical Service, Petrochemicals Dept., American Cyanamid Co., 30 Rockefeller Plaza, New York, N. Y.

Resins based on acrylonitrile are inert not only to hydrocarbon solvents, but also to other agents. Navy researchers took advantage of this factor in the design of protective coatings for the inside of fuel storage tanks (8,9). These coatings require inertness to both fuel oils and sea water. On the other hand, drying oils modified with styrene-acrylonitrile polymers are reported to be unusually alkali-resistant (12), and emulsions containing copolymers of acrylonitrile with isobutylene produce coatings which are impermeable to water vapor (17).

The following discussion describes these applications in greater detail, and touches on some others. Hundreds of uses of acrylonitrile are reported annually; accordingly, it is necessary to limit the discussion mainly to applications in paints, drying oils and miscellaneous protective coatings for metal and wood. Since acrylonitrile is usually used as a copolymer, a section on experimental aspects of copolymer formation is also included.

Acrylonitrile Polymers and Copolymers

Use in Paints

A variety of resins containing copolymers of acrylonitrile are being used in paint formulations. Among these are acrylonitrile—vinylidene chloride latices and styrenated alkyds.

Styrenated alkyd resins are valuable because of their fast dry, high gloss, and good chemical resistance. However, they are not as resistant to oils, greases, and hydrocarbon solvents as ordinary alkyds.

If acrylonitrile replaces part of the styrene (or methyl styrene), the solvent resistance is greatly

improved. Furthermore, the drying time and viscosity are also enhanced. Table I illustrates these improvements (11,24).

Formulation	
Material	**Parts**
Linseed alkyd	60
Monomer	40
Di-tert-butylperoxide	1
Xylene	100

Monomer Styrene	Composition, % Acrylonitrile	Viscosity, Gardner-Holdt	Tack-free time, min.[a]	Mineral Spirits resistance, min.
40	0	B	88	10
38	2	C	96	20
35	5	G-H	99	80
30	10	Y—	24	>360
28	12	Z_5 tail	10	>360

[a] measured with Atlas Tack Tester, 300 g. weight.

Table I. Properties of films based on interpolymers of linseed alkyd, acrylonitrile and styrene.

Similarly, acrylonitrile improves the properties of tall oil-modified alkyd resins. This is shown in Table II (11,24).

An acrylonitrile-modified styrenated alkyd resin is offered commercially by American Cyanamid Company as Cycopol[R] Resin 320-5 (4). This product is completely compatible with nitrocellulose and vinyl resins VAGH and VYHH, but its compatibility with Beetle[R] and Cymel[R] resins is limited. It is completely soluble in aromatic hydrocarbon solvents but has little tolerance for low-solvency thinners. Its specifications are the following:

Solids ± 1%	50%
Xylene	50%
Color, Gardner 1933	9-12
Viscosity, Gardner-Holdt, 25° C.	X-Z_1
Acid no., solid resins	4-8
Pounds per gallon, approx.	8.0

This resin air-dries and bakes hard with unusual speed. Curing schedules range from 10-15 minutes at 200° F. to 5 minutes at 300° F. Baked films are superior for marproofness and chemical resistance. These properties make the resin especially useful in industrial enamels, automotive finishes, machinery enamels, floor finishes, and toy enamels.

R—Reg. U. S. Pat. Office

Another paint with good film properties is a white interior wall paint compounded from a 50-50 acrylonitrile-ethyl acrylate copolymer (1). Since this copolymer does not form a continuous film on air drying, it must be plasticized with a linseed oil type, 27% phthalic alkyd.

Latices based on acrylonitrile-vinylidene chloride copolymers are also suitable for paint use (16). Dow offers these resins commercially as Saran F122A20 containing dibutyl phthalate plasticizer. Paints formulated from these latices wear very well, resist chemical attack, and are outstanding for brushability, leveling, and absence of foam. Suggested applications are industrial maintenance, shops, power plants, food processing plants, and dairies where grease and food acids are troublesome.

The shortened drying time of acrylonitrile-modified styrenated alkyd resins suggested that they might be useful in printing inks. Accordingly, a process has been patented (26) for preparing printing inks from tall oil-modified alkyd resins which contain a styrene-

Formulation	
Material	**Parts**
DDTOFA[a] Alkyd	60
Monomer	40
Di-t-butylperoxide	1
Xylene	100

Monomer Styrene	Composition, % Acrylonitrile	Viscosity, Gardner-Holdt	Tack-free time, min.	Mineral Spirits resistance, min.
40	0	A	322	6
38	2	A-B	283	8
35	5	D	256	30
33	7	F-G	62	60
30	10	Q-R	19	—

[a] Double-distilled tall oil fatty acid.

Table II. Properties of films based on interpolymers of DDTOFA alkyd, acrylonitrile and styrene.

acrylonitrile copolymer. The following is a typical ink formulation (26).

Material	Parts
Crude Tall Oil	170
Maleic Acid	10
Pentaerythritol	25
Varsol No. 1	45
Butyl Carbitol	1
Acetone	0.5
Cobalt Naphthenate	0.5
Cumene Hydroperoxide	2
Zinc Peroxide	0.5
To this mixture are added the following materials:	
Styrene	16
Acrylonitrile	4
P-1 Ink Oil	100

A solution of the resulting resin containing 60% resin solids has a viscosity of about 17.6 poises or Y on the Gardner-Holdt scale (26).

Use in Fuel-Inert Coatings

Steel tanks used for the transportation and storage of petroleum products are subject to corrosion from several sources (9). For instance, it is usual to ballast ocean-going tankers with sea water. Hot water jets are frequently used to remove flammable vapors and to dislodge scale from the tank surface. The fuel itself may contribute indirectly to corrosion, due to the fact that oxygen is some six times more soluble in gasoline than in salt water. Thus, when sea water enters the tanks a large reservoir of oxygen is available from the gasoline.

Work at the Industrial Test Laboratory of the Philadelphia Naval Shipyard on these corrosion problems involved testing several organic polymeric materials as protective coatings for the interior of steel tanks (9). Early tests eliminated many conventional materials, such as shellac, nitrocellulose, and phenolic resins. The most promising coatings appeared to be vinyl, polysulfide, and vinylidene chloride-acrylonitrile type resins.

These latter three materials were tested more extensively under actual operating conditions on Navy tankers. Before application of these resins, it was first necessary to thoroughly clean the tank surface by sand blasting. The polusulfide resin was applied to an average thickness of 13.1 mils by brushing on the first coat and then spraying on three additional coats. One brush coat, followed by five spray coats, gave a vinyl coating having an average thickness of 7.4 mils. Five coatings of vinylidene chloride-acrylonitrile were applied by brush to an average thickness of 7.1 mils.

This service trial lasted for 43 months. During the first 34 months, a log of operations was kept as follows:

a. 397 days carrying motor or aviation gasoline

b. 18 days carrying sea water ballast

c. 16 gas-freeing operations (hot sea water jets at 175° F. total time for 100 hours)

d. Otherwise empty, but exposed to salt air, sea water on tank bottom and condensation.

During this test period, the three coatings were carefully inspected for signs of deterioration. The polysulfide material blistered and peeled and rust developed beneath the coating after less than 13 months' service. The vinyl coating gave excellent service for 19 months, but between this time and 34 months extensive blistering and peeling occurred. The most satisfactory coating was the vinylidene chloride-acrylonitrile resin.

In this case, moderate pinpoint rusting was the only sign of deterioration. However, even this rusting could be prevented by occasional touch-ups. It is stated that this type of coating is satisfactory for four years, and that touch-ups extend the life of the coating indefinitely.

As a result of these tests, the Navy uses a vinylidene chloride-acrylonitrile resin as a standard coating where a fuel-resistant tank lining is required (9). The resin is generally applied as a 20% solution in methyl ethyl ketone to a thickness of 0.008 inches. Pigmentation is produced by the incorporation of titanium dioxide or an orange toner. The pigment is included to provide contrast between coats and good visibility during application.

During World War II concrete storage tanks lined with organic coatings played an important role in the Navy's fuel storage program. The availability of organic materials inert to a variety of fuels and able to seal concrete against seepage made this program possible.

Two types of coating were used. One was a polysulfide rubber (Thiokol) which was applied either as sheets by means of a special adhesive or by brush or spray gun. The other type of film consisted of several coats of fuel-inert vinyl paint.

Although these coatings proved satisfactory as wartime expedients to conserve steel, they, nevertheless, had some shortcomings. Vinyl polymers lacked extensibility and polysulfide rubbers were attacked by mold and fungus, especially in tropical climates. Furthermore, the necessity of removing large volumes of solvent vapors made application of these coatings somewhat hazardous.

Work performed at the Naval Research Laboratory in Washington, D. C. resulted in a solution to these problems (8). By combining the fuel-inertness of vinylidene chloride-acrylonitrile copolymers with the extensibility of polysulfide rubbers, a coating was developed which displayed inertness to a wide range of fuels—from Diesel to jet—and which possessed extremely long life (fully satisfactory after four years).

An even more important achievement was the development of a satisfactory lining applicable from an aqueous dispersion, which eliminated the need for using highly flammable solvents. This dispersion contained a vinylidene chloride-acrylonitrile copolymer in combination with a polysulfide rubber. Since this dispersion could be applied at a high solids content, fewer coats were needed.

Coating Type	No. of Coats	Days in Test	Film Condition			Over-all
			Blistering	Checking	Other	
Polysulfide Rubber[a]	6	735	Moderate	None	Soft	Poor
Vinylidene chloride-acrylonitrile[b]	6	980	Slight	None	Discolored	Fair +
Polysulfide rubber-vinyl emulsion (WD-6/VAGH)	6	805	Slight	None	Some loss of adhesion	Fair
Polysulfide rubber-vinylidene chloride-acrylonitrile emulsion (WD-6) Saran F-120[c]	6	805	None	None	None	Excellent

[a] Approved for use as tank lining against Bu Docks Specs. 14a.
[b] Bu Ship's formula 113, approved lining for tanks.
[c] Best formula.

Table III. Fuel-water resistance of representative coatings on concrete.

Tables III, IV and V (8) serve to illustrate the improvements in concrete fuel tank coatings brought about by the incorporation of vinylidene chloride-acrylonitrile copolymers.

The resulting latex was coagulated with brine, filtered, washed with water, and dried. A 15% solution of the resin in benzene gave a tough, transparent, naphtha-insoluble film when applied to a metal surface."

Formula	Parts	Coats	Film Condition			Over-all
			Blistering	Checking	Other	
1. Thiokol WD-6 (prime)		4	None	None	Slight discolor	Very good
Saran F-120 (seal)		5				(1510 days)
2. Thiokol WD-6 (prime)		4	None	Slight	Coatings	Unsatisfactory
Bakelite Vinyl Resins VAGH (top coat)		5			Separated	(105 days)
3. Reverse Phase Emulsion		6	None	None	Slight Discolor	Very good (980 days)
Thiokol WD-6	50					
Saran F-120	46					
Bakelite Vinyl Resin VMCH	4					
Micalith-G	20					

(less adhesion than formula No. 1)

Table IV. Fuel-water inertness of experimental linings on concrete.

Another type of oil-resistant coating has been patented by the Standard Oil Development Company (29). This coating, which consists of an interpolymer of acrylonitrile, styrene, and a diolefin, is

Coating Composition	%	Test Fluid	
		SR-6/Sea Water[a]	JP-4C/Water
Saran F-122-A20	100	Satisfactory	Satisfactory
Saran F-122-A20	60	Satisfactory	Satisfactory
Thiokol WD-6	40		
Saran F-122-A20	40	Failed (34 days)	Satisfactory
Thiokol WD-6	60		

[a] SR-6 = 60% iso-octane, 20% toluene, 15% xylene, 5% benzene (by volume)

Table V. Inertness of Saran coatings on concrete at 130 deg. F after 598 days.

said to be a hard, naphtha-insoluble, benzene soluble resin. The preparation of such a resin is described in the following manner:

"Seventy (70) parts styrene, 15 parts acrylonitrile, and 15 parts isoprene were copolymerized in a soap solution using lauryl mercaptan-potassium persulfate as promoter-catalyst. The reaction was carried out for 16 hours at 27°C.

Use in Drying Oils

Drying oils modified with styrene-acrylonitrile polymers or copolymers are described in the patent literature (12). Claims of unusually strong alkali resistance are made for these oils. They are prepared by heating an unconjugated drying oil, styrene and/or acrylonitrile in the presence of an organic peroxide catalyst. In order to induce copolymerization of the drying oil with the vinyl monomers, it is necessary to partially oxidize the oil either separately or in situ. The following is a typical preparation:

"Three-hundred-twenty-five (325) grams of a mixture of oxidized linseed oil, acrylonitrile, and benzoyl peroxide containing about 5% acrylonitrile and 1% benzoyl peroxide were well mixed and poured into a three-necked flask provided with stirrer, reflux condenser, and an air inlet. This mixture was air blown and stirred under reflux at 95°, for about 25 hours. At the end of this time a tough copolymer gel was obtained."

The alkali resistance of these copolymer gels was tested in the following manner:

"About 2 grams of a copolymer gel were pressed between rolls of coarse thin cloth at 8,000 psi. Uniformly sized strips of this treated cloth were suspended in a 5% solution of sodium hydroxide for 2 hours. The resistance to alkali was determined by weighing the sample before and after exposure. Table VI shows the results of these measurements."

COPOLYMER COMPOSITION, %				
Oxidized Linseed Oil	Styrene	Acrylonitrile	Benzoyl Peroxide	Weight Loss, %
94.0	5	—	1	5.0
89.0	10	—	1[a]	4.8
89.0	10	—	1	5.0
94.0	—	5	1	2.8
Control (Blown Linseed Oil)				8.5

[a] Urea Peroxide

Table VI. Resistance of various copolymers to alkali.

Enamels which employ butadiene-styrene copolymers as vehicle may be improved by adding small amounts of various polar modifying agents (14). These agents belong to two categories: (1) polar thiol compounds capable of adding to the polymeric double bonds; and (2) monoethylenically unsaturated compounds capable of reacting with methylene groups vicinal to the double bonds of the polymer.

Acrylonitrile is included in this latter group. Adding this compound in amounts of less than 4% produces marked improvements in leveling, drying time, and oil-to-pigment ratio. Moreover, gloss uniformity and wetting power are greatly improved.

The beneficial treatment with acrylonitrile may be carried out by adding the monomer to the finished butadiene-styrene copolymer, and heating this mixture in the presence of a peroxide catalyst. For example, a butadiene-styrene drying oil was prepared from the following formulation.

Materials	Parts by Weight
Butadiene-1,3	80
Styrene	20
Varsol	200
Dioxane	40
Isopropyl alcohol	0.2
Sodium (10-50 microns)	1.5

A mixture of 100 parts of this drying oil (50% nonvolatiles in straight run mineral spirits), 2 parts of acrylonitrile, and 0.35 part of t-butyl hydroperoxide was refluxed for six hours at 70° C. This material was then used in the preparation of an enamel having the following composition:

Titanium dioxide	100 g.
Synthetic Drying Oil (50% in Varsol)	200 g.
Naphthenate driers (Co, Mn, Pb)	0.6%

This enamel was applied to steel panels both by pouring and brushing, and the films were then inspected for gloss, drying time, leveling, and paste factor. Table VII (14) compares the film properties of enamels prepared from both modified and unmodified drying oils. Perhaps the major contributions of these polar modifying agents are reproducibility and uniformity. Note that the film properties of the enamel with untreated drying oil vary extensively from sample to sample, but the film properties of the same enamel, with modified drying oil are quite reproducible.

Miscellaneous Uses

a. Floor Coatings. An extremely scuff-resistant resin, especially valuable for floor coatings, has been patented by the R. M. Hollingshead Corporation (5). The film forming material consists of shellace, a terpene-phenolic resin, and a synthetic rubber.

Material	Weight Per Cent
Esterified terpene	6.0
Shellac	3.4
Terpene phenolic resins	3.4
Butadiene-acrylonitrile copolymer	4.0
Ammonia	1.4
Sulfates and phosphates of a series of higher synthetic alcohols ranging in carbon content from 8-17 atoms	0.9
Water	80.9

Modifier	Dry Oil Vis. (Poise)	g. Oil per 100 g. pig.	Gloss, poured Film	Gloss, brushed Film	Leveling	Drying Rate (Hrs.) Set to Touch	Tack Free
None	0.9	121.5	Flat	Egg Shell	Poor	4-6	24
None	1.2	122.5	Excellent	Excellent	Excellent	4-6	24
None	0.5	142.0	Flat, Seedy	Fair	Poor	4-6	24-48
None	0.8	154.7	Flat	Fair	Poor	4-6	24
Acrylonitrile, 2%[a]	1.0	62.3	Excellent	Excellent	Excellent	2-4	6
Acrylonitrile, 4%[a]	1.2	52.2	Excellent	Excellent	Excellent	2-4	6
Acrylonitrile, 4%[c]	5.5	47.2	Excellent	Excellent	Excellent	2-4	6
Acrylonitrile, 2%[b]	1.3	38.1	Excellent	Excellent	Excellent	6	20-24
Acrylonitrile, 0.25%[b]	1.2	57.0	Excellent	Excellent	Excellent	6-8	24
Acrylonitrile, 0.75%[b]	1.1	53.8	Excellent	Excellent	Excellent	6-8	24
Cinnamaldehyde, 2%[b]	1.3	64.0	Excellent	Excellent	Excellent	6	24
Butyl Acrylate, 2%[b]	1.3	53.4	Excellent	Excellent	Excellent	6	24
$SHCH_2COOH$, 0.5%[d]	1.0	35.0	Good	Good	Good	8	20-24
$SHCH_2COOH$, 0.1%[d]	1.0	53.8	Good	Good	Good	6-8	24
$SHCH_2COOET$, 0.5%[d]	1.0	44.0	Good	Good	Good	8	20-24

[a] Reacted for 6 hours at 70°C. t-butyl hydroperoxide catalyst.
[b] Reacted for 3 hours at 200°C. (No catalyst).
[c] Reacted for 22 hours at 90°C. t-butyl hydroperoxide catalyst.
[d] Reacted for 0.5 hours at 160°C. (No catalyst).

All enamels have the same composition except for variation in the modifier content.

Table VII. Film properties of modified butadiene-styrene drying oils.

b. Vapor Barrier Coating Compositions. The condensation of water vapor within the outside walls of buildings causes considerable difficulty. The water vapor is generated inside the building and is condensed on the outside wall at any point where the temperature is below the dew point. Continued condensation produces soggy insulation and causes rotting of the wall, framework, and sills. As the water penetrates to the outside of the wall, it causes blistering and peeling of the paint.

Application to the interior wall surface of an emulsion-type coating composition which is impermeable to water vapor avoids these difficulties (17). One such coating contains elastomeric vinyl polymers, such as acrylonitrile-isobutylene copolymers. The formulation for a vapor barrier emulsion coating composition using an acrylonitrile-isobutylene latex is given below:

Materials	Parts by Weight
Water	29
Soya Protein Solution (14% protein)	25
Aqueous solution (25% solids) of the neutral soap of monoethanolamine and lauric acid	2

These ingredients were mixed thoroughly, and then 4 parts of zinc stearate and 4 parts of an antioxidant were added. The following ingredients were then further added:

Materials	Parts by Weight
Water	57
Soya Protein Solution	55
Lauric Acid Soap	6
Pine Oil (Antifoam)	1
Zinc Oxide Pigment	15
Fine Mica	100
Acrylonitrile-isobutylene latex at 50% solids and 4% of resin solids of alkali soaps	400

Enough water was added to this mixture to yield a composition containing 56.8% water. A single coat of this material produced a film which passed the FHA vapor transmission requirements.*

c. Coatings for Atomic Energy Installations. Isotopes of uranium may be separated by allowing gaseous uranium hexafluoride (UF_6) to diffuse through a porous, permeable membrane. Because of the corrosiveness of UF_6, there are few construction materials which are satisfactory for this process. Ordinary metals are severely attacked by UF_6. These metals may be made inert, however, by applying a polymer to the metal surface and then fluorinating the polymer in situ (23).

One polymer which has been used is Buna-N rubber (a copolymer of acrylonitrile and butadiene). The polymer is usually applied by dissolving it in a solvent and painting or spraying the solution onto the metal, then allowing the solvent to evaporate. The resulting film is then exposed for one hour to an atmosphere of 50% nitrogen and 50% fluorine at 25° C. Finally, 100% fluorine is passed over the material for eight hours.

*Transmission rate 6 grams of water/M² in 24 hours at 50% versus 5% relative humidity at 73 deg. F.

These fluorine-treated films adhere very well to the metal surfaces, and are practically totally inert to 100% UF_6.

Acrylonitrile Derivatives

Solvents

The nitrile group has a solubilizing effect on certain compounds. Since this group may be introduced into a molecule by cyanoethylation, acrylonitrile is a particularly valuable intermediate for the preparation of solvents.

The alkoxypropionitriles produced by the cyanoethylation of alcohols possess excellent solvent properties (20).

$$ROH + CH_2 = CHCN \xrightarrow{\text{base}} ROCH_2CH_2CN$$

These alkoxypropionitriles are miscible with most organic compounds, including alcohols, acetone, ether, and benzene. In addition, the lower molecular weight nitriles are quite soluble in water. (Note: The reference cited above states that all β-alkoxypropionitriles are insoluble in water. However, solubility measurements made at the Stamford Research Laboratories of American Cyanamid Company show that the solubility of methoxypropionitrile at 25° C. is 33.5% and that the solubility of isopropoxypropionitrile at 25° C. is 6.4% (3).

These alkoxypropionitriles are also good solvents for several high polymers (20). Polyvinyl acetate, polyvinyl chloride, and vinyl chloride-vinyl acetate copolymer dissolve easily. Polymethacrylates dissolve on warming, and secondary cellulose acetate exhibits a graded solubility. Polyvinyl acetals are only slightly soluble in the boiling alkoxy nitriles. Cellulose acetate butyrate and ethyl cellulose are dissolved only by the higher molecular weight nitriles.

Compounds such as nylon, rubber, and nitrocellulose do not dissolve, although nitrocellulose swells when placed in alkoxypropionitrile solutions. Cyanoethylated ethanolamines are reported to be solvents for nitrocellulose (18).

The dipropionitriles, resulting from the reaction of acrylonitrile with water or hydrogen sulfide, are particularly useful solvents in that they selectively dissolve compounds of differing saturation.

$$H_2O + 2CH_2 = CHCN \xrightarrow{\text{base}} O(CH_2CH_2CN)_2$$

$$H_2S + 2CH_2 = CHCN \xrightarrow{\text{base}} S(CH_2CH_2CN)_2$$

Preliminary experiments (1) with these solvents have indicated two general fields of usefulness: (1) separation of aromatics from paraffins; (2) separation of compounds with only slight differences in unsaturation by fractional partition between a dipropionitrile and a paraffin.

The dipropionitriles are believed to be considerably more selective for aromatics relative to paraffin than any other known solvents (25). For example, studies indicate that the selectivity of β, β'-oxydipropionitrile for the removal of naphthalene from a paraffin stream is about 35 times greater than that of furfural, 27 times greater than that of dimethylformamide, and 9 times greater than that of sulfolane. Furthermore, the mutual solubility of the dipropionitriles and paraffins is extremely small. The best available

Agent	(a) Concentration	Pot Life, Minutes Epon 828 at R. T.	Epon 834 at 50°C.	Initial Viscosity, cps of catalyzed Epon 834 at 50°C.	at R. T.	Optimum Curing Schedule
Diethylene triamine	8	53	10	8,000	—	30 min. 115°C.
Dimethylaminopropylamine	6	55	10	30,000[b]	—	60 min. 80°C.
Benzyldimethylamine	6	229	20	7,000	—	60 min. 80°C.
Piperidine	6	6 hrs.	30	1,000	—	180 min. 80°C.
Diethylamine	12	6	45	400	4,000	150 min. 115°C.
Pyridine[c]	15	25	3½ hrs.	600	2,500	120 min. 80°C.
Diethylaminopropylamine	6	210	30	7,000	—	60 min. 115°C.

[a] Parts per 100 parts of resins.
[b] Gelling thickened the mixture before a reading could be taken.
[c] Laminates cured with pyridine are black.

Table VIII. Amine curing agents for Shell Epon 828 and 834.

estimate indicates that solubility of paraffins in β, β'-oxydipropionitrile to be 0.1% (1). The solubility of the nitrile in the paraffin is negligible. These solubility characterisitcs give these solvents the ability to separate aromatics from paraffins and produce an aromatic extract of nearly 100% purity and a raffinate (paraffin layer) containing negligible amounts of solvent.

It is quite possible that these solvents may be valuable in the refining of certain grades of petroleum and soya oils. This is particularly true in cases where isolation of paraffin-free aromatics or unsaturates is desireable. Other separations which these dipropionitriles may facilitate include the isolation of pure, high-boiling olefins from saturated hydrocarbons, the purification of butadiene, and the purification of tall oil and rosin.

Curing Agents for Epoxy Resins

Acrylonitrile will react with dialkylamines to produce dialkylamino propionitriles in good yields.

$$R_2NH + CH_2 = CHCN \longrightarrow R_2NCH_2CH_2CN$$

Diethyl-(30), methyl-n-propyl-(7), and di-n-butyl-(30) amines give 97%, 93%, and 96% yields respectively.

Hydrogenation of these cyanoethylated secondary amines produce the corresponding propylamines which may be used as curing agents for epoxy resins. Dimethylaminopropylamine and diethylaminopropylamine, in particular, have been tested for this use and found to be satisfactory (27).

Curing agents for epoxy resins are usually used in amounts of 6 to 16%. The actual amount required depends on the amine which is used. Other factors such as pot life and initial viscosity vary with the amine being used.

Good mixing of curing agent and resin is quite necessary to insure uniform properties in the cured resins. Since some epoxy resins are highly viscous at room temperature, it is good practice to preheat the resin to about 40-50° C. before addition of the curing agent. Xylene in concentrations up to 5% may also be used to reduce the viscosity of the resin.

In Table VIII (27) the properties of the propyl amines are compared with the properties of several other compounds which the Shell Chemical Company recommends as curing agents for their Epon 828 and 834 epoxy resins.

Experimental Considerations

Acrylonitrile is usually incorporated in surface coating formulations in the form of a copolymer. Let us therefore consider some of the experimental aspects of copolymerization reactions.

Ordinarily, different monomers will copolymerize at different rates. Thus, the more reactive monomer disappears at a faster rate than the less active monomer. As a result, the composition of the copolymer continuously changes during a batch reaction.

Many applications do not require a copolymer of uniform composition. However, there are many more which require a copolymer with a relatively narrow range of composition, e. g., to improve the strength or clarity of the copolymer (2,6,28).

Copolymers of uniform composition can be obtained by utilizing certain polymerization techniques. Obviously, a narrow spread in composition can be obtained by interrupting the polymerization at an early stage. However, in practice this involves recovering and recycling a large proportion of the original monomer mixture. This can be avoided if the more reactive monomer is continuously added during the polymerization at such a rate as to hold constant the desired ratio of monomer concentration. This can be achieved by adjusting the feed rate to maintain a constant reflux temperature.

A copolymer of predetermined initial composition can be obtained by using the correct monomer concentration. While this concentration may be determined by trial and error, it can be more easily calculated from the reactivity ratios r_1 and r_2 for the two monomers (M_1 and M_2). These ratios are defined in Chart I.*

On a weight basis this means that the monomer concentration should be 81% acrylonitrile and 19% methyl acrylate.

It should be emphasized that this monomer charge will produce the desired copolymer composition in the initial copolymer only. To produce a copolymer having the desired composition throughout, it is necessary to employ the following procedure:

Place the calculated charge (i.e., 81% acrylonitrile, 19% methyl acrylate) in the reactor and initiate polymerization at reflux temperature. Then add a mixture of *monomers* having the same composition as the *copolymer* initially formed (i.e. 75:25). In this

* For a more detailed explanation see reference (22).

$$r_1 = {}^{k_{11}}/_{k_{12}},\ r_2 = {}^{k_{22}}/_{k_{21}}$$

where k_{11} = rate constant for the reaction, $RM_1 + M_1 \xrightarrow{k_{11}} RM_1 \cdot M_1$;

k_{12} = rate constant for the reaction, $RM_1 + M_2 \xrightarrow{k_{12}} RM_1 \cdot M_2$;

k_{22} = rate constant for $RM_2 + M_2 \xrightarrow{k_{22}} RM_2 \cdot M_2$;

and k_{21} = rate constant for $RM_2 + M_1 \xrightarrow{k_{21}} RM_2 \cdot M_1$.

By utilizing these reactivity ratios in the equation,

$$C = P-1 \sqrt{\frac{(1-P)^2 + 4(P)\ (r_1)\ (r_2)}{2r_1}}$$, where C = mole ratio of M_1 to M_2

charge and P = mole ratio of M_1 to M_2 in copolymer, one may calculate the monomer concentration required for any desired copolymer composition. This is illustrated by the following example:

Copolymer composition desired: acrylonitrile (M_1) = 75% by weight

methyl acrylate (M_2) = 25% by weight

Therefore, $P = \frac{M_1}{M_2} = \frac{75/53}{25/56} = 4.84$.

From the table, $r_1 = 0.67$ and $r_2 = 1.26$. Substituting in the above equation, we obtain:

$$C = \frac{(4.84-1) + \sqrt{(1-4.84)^2 + 4(4.84)\ (0.67)\ (1.26)}}{2(0.67)}$$

Therefore, C = 7.0 moles M_1 per mole M_2.

Chart I

way the monomers are converted to copolymer as fast as they are added. This addition should be carried out at such a rate as to maintain a constant reflux temperature. As soon as all the feed has been added, stop the polymerization and recover the unreacted monomer.

The arrangement of monomer units in a copolymer also depends on the relative reactivities of the monomers. If the product of the monomer reactivity ratios is unity ($r_1 \times r_2 = 1$), then the monomer units will be arranged completely at random in the chain. As

(*Turn to page 109*)

EPOXIDATION and USES of EPOXIDES in COATINGS

Part III—Epoxy Plasticizers and Stabilizers

By
Dr. Daniel Swern*

In the first two parts of this series we described methods of preparation of epoxy compounds and provided background material on plasticizers and stabilizers, particularly for polyvinyl chloride and its copolymers.

Part III describes the use of epoxy compounds as plasticizers and stabilizers for polyvinyl chloride and the evaluation of the formulations obtained. Part IV (conclusion) will appear in the July issue will be concerned with epoxy resins and a discussion of the reactions of epoxides of potential interest to the surface coatings industry.

EXAMINATION of the Table of plasticizers in Part II (May issue, page 33) of this series reveals that fats or compounds simply derived from them make up an extremely small part of the total production of plasticizers. Yet such compounds have relatively low vapor pressures, limited solubility in and extractability with water, and they are inexpensive and plentiful—characteristics which are highly desirable in plasticizers. Unfortunately, it is the poor compatibility of fats and their simple derivatives with synthetic resins in general and with polyvinyl chloride in particular that has seriously restricted their use in the plasticizer field.

Up to within a few years ago, where compounds derived from fats achieved any reasonable use, they were "secondary" plasticizers rather than "primary" or true solvent plasticizers. By way of definition, it should be pointed out that a primary or solvent type plasticizer is one which can be used as the sole plasticizer even in relatively high percentages of the total formulation. Fat-derived products have been used to provide hand and drape to vinyl sheeting, to serve as lubricants in milling to reduce milling temperatures and, if the price is satisfactory, to serve as diluents for more expensive plasticizers.

Ricinoleates are the best known and possibly the most widely used secondary plasticizers derivable from fats, and they possess good low temperature characteristics. Examples are methyl acetylricinoleate, butyl acetylricinoleate, and propylene glycol di(acetylricinoleate). Esters of oleic, palmitic and stearic acid have also been used as secondary plasticizers. The first, generally, has better heat stability and compatibility. These esters frequently impart good low temperature and processing qualities to polyvinyl chloride. Examples are methyl cellosolve oleate, diethyleneglycol monooleate, glyceryl monooleate, polyethyleneglycol monooleate, dimethyl glycerol ether oleate, phenyl oleate, tetrahydrofurfuryl oleate, glyceryl monostearate, benzyl stearate, diethyleneglycol monostearate, ethylene glycol monostearate, phenyl stearate, butyl stearate and isooctyl palmitate.

Ether linkages and cyclic groups seem to improve compatibility. Chlorinated alkyl stearates have also been suggested for use as plasticizers. Three to six chlorine atoms per molecule are apparently required to achieve sufficient compatibility, but the introduction of the highly polar chlorine atoms increases dielectric loss. Acetoglycerides have also been suggested as secondary plasticizers.

The compatibility of long chain compounds can be increased by the introduction of the three membered epoxy ring into the molecule. As we saw in Part I of this series, this can be readily accomplished by epoxidation of unsaturated fats or fatty derivatives

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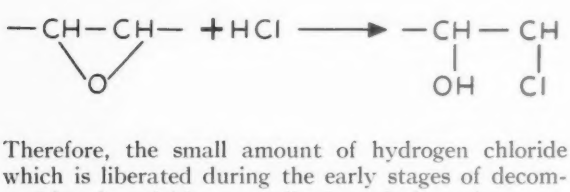
with organic peracids. Although this reaction has been known for some time, practical, efficient and high yield procedures for carrying it out were developed only within the past ten years. Besides enhancing the compatibility of long chain fatty compounds with polyvinyl chloride, epoxidized fatty materials when used to the extent of 1-5% of the formulation have recently been shown to be excellent light stabilizers.

As we pointed out in Part II, chlorine containing vinyl resins, of which polyvinyl chloride is by far the most important, decompose with the liberation of hydrogen chloride when they are exposed to heat and/or light. The hydrogen chloride liberated seems to speed up further decomposition when oxygen is present, and within a short time the plastic material is discolored, brittle, weak and of little value. Epoxidized fatty materials react rapidly and quantitatively with hydrogen chloride, as the equation shows:



Therefore, the small amount of hydrogen chloride which is liberated during the early stages of decomposition is quickly neutralized, and the subsequent accelerated decomposition is checked before it can get started. In addition to their main characteristic of stabilizing polyvinyl chloride, epoxidized fatty materials are compatible, they have low vapor pressures and excellent resistance to migration and water.

The first epoxy stabilizer, epoxidized soybean oil, became available commercially over five years ago. Soybean oil was chosen for epoxidation because it was cheap and plentiful, it could be epoxidized to a relatively high oxirane content and its volatility loss from polyvinyl chloride was low. Epoxidized soybean oil cannot be used as a primary plasticizer, however, because its compatibility with polyvinyl chloride is not high enough. In an attempt to obtain epoxy stabilizers which are also primary and solvent-type plasticizers, considerable industrial research effort has been expended in the preparation and evaluation of epoxidized esters of oleic acid and of tall oil fatty acids. Butyl epoxystearate and 2-ethylhexylepoxystearate, also derivable from inexpensive fat sources, such as tallow and grease, are examples of members of the former group. The compatibility of many of the simple alkyl epoxystearates is high, they impart good to outstanding low temperature characteristics to polyvinyl chloride, and they are efficient plasticizers, as shown by their effect on modulus, elongation and tensile strength. These monomeric epoxy plasticizers, however, frequently have poor migration characteristics and their volatility is relatively high. When molecular weight or chain length of the ester part of the molecule is increased sufficiently to reduce volatility loss to a satisfactory level, compatibility and efficiency are often adversely affected.

Properties

The evaluation of a large number of epoxy esters as plasticizers and stabilizers for polyvinyl chloride will now be described and the results will be critically evaluated. A standard formulation is used throughout:

Polyvinyl Chloride:Acetate Copolymer(95:5)	64.5 Parts
Epoxy Plasticizer-Stabilizer	35 "
Stearic Acid	0.5 "

When di(2-ethylhexyl)phthalate(DOP) or tricresyl phosphate(TCP) is employed, 1% of lead carbonate is used as a stabilizer. The epoxy esters require no additional stabilizer since they combine plasticizing and stabilizing characteristics in one molecule.

The Table I summarizes the properties of polyvinyl chloride-acetate copolymer (95:5) plasticized with epoxy esters. For comparison, the same copolymer plasticized with DOP and TCP is also included in the table.

Mechanical: Comparable tensile strength, ultimate elongation, 100% modulus, and hardness are obtained with the epoxy esters having molecular weights below about 460. Their efficiency appears to be comparable to that of DOP, with the exception of the monoesters of the lowest molecular weight such as butyl-, 2-ethylbutyl- and hexyl epoxystearate, which are somewhat more efficient. Included in this group are epoxy compounds containing one, two or three ester linkages. Dihydronopyl epoxystearate, with a molecular weight similar to that of the diesters, is less efficient, as shown by a somewhat higher tensile strength, 100% modulus, and hardness. This compound contains a single ester group but has a substantially higher molecular weight than the other monoesters. Increasing the molecular weight to 900 or above (epoxidized soybean oil) reduces the efficiency of the plasticizer slightly. In addition to a higher 100% modulus and greater hardness, the elongations at break are considerably less. The presence of a saturated or unsaturated ring in the epoxy compound (benzyl and cyclohexyl epoxystearate) appears to produce a slight decrease in the efficiency of the plasticizer.

Low Temperature Flexibility: Gradually decreasing the temperatures to very low values causes all plasticized systems to become brittle and stiff. While the stiffness increases gradually, brittleness seems to occur at rather sharply defined temperatures. It has become common practice to measure either the brittle temperature or the stiffness in torsion, or both, as a function of temperature. The latter method was introduced by Clash and Berg, who empirically selected an apparent modulus of elasticity of 135,000 pounds per square inch as the borderline between a rigid and a nonrigid material. The temperature required to reach this value corresponds to the stiffening or Clash-Berg temperature. Table I also gives the stiffening temperatures for the formulations plasticized with epoxy esters.

The table shows that the epoxy monoesters have better low temperature flexibility than DOP and considerably better than TCP. The epoxy triesters of low molecular weight (epoxidized diacetomonoglycerides of oleic acid and of soybean oil) are comparable to DOP, while the triesters of higher molecular weight (epoxidized soybean oil) show somewhat higher Clash-

Properties of Vinyl Copolymer (95:5 Chloride:Acetate) Plasticized With Epoxy Esters at the 35% Level

Epoxy Ester	Tensile Strength	Elongation	Modulus 100%	Stiffening Temp.	Migration[a] Wt. Loss After 14 Days, %	Volatility[a] Wt. Loss, %
Epoxidized Soybean Oils (Commercial)	3090	290	1660	−17	3.0	0.25
Epoxidized Diacetomonoglycerides						
Of Tallow	2770	365	1230	−19	—	—
Of Lard	3120	400	1300	−21	—	—
Of Cottonseed Oil	3160	410	1240	−23	6.1	0.36
Of Soybean Oil	2920	400	1120	−26	9.1	0.42
Epoxidized Diacetomonoolein	3160	360	1490	−27	10.7	0.98
Benzyl Epoxystearate	2960	370	1250	−39	—	—
Butyl Epoxystearate	2440	460	1010	−51	22.3	3.55
Cyclohexyl Epoxystearate	3050	350	1350	−36	—	—
Dihydronopyl Epoxystearate	3370	335	1650	−30	—	—
2-Ethylbutyl Epoxystearate	2730	350	1290	−55	22.7	1.5
Methoxyethyl Epoxystearate	2830	370	1130	−45	—	—
Isodecyl Epoxystearate	2410	220	1640	—	—	—
Isooctyl Epoxystearate	2800	310	1550	—	—	—
Tetrahydrofurfuryl Epoxystearate	2730	360	1010	−37	—	—
Phenyl Epoxystearate	2850	410	1110	−33	—	—
Acetoxyethyl Epoxystearate	2910	410	1030	−41	—	—
Butyl Epoxytallate[b]	2850	380	1170	−41	—	—
Glycidyl Epoxystearate	2290	340	920	−42	—	—
Tert-Butylphenyl Epoxystearate	3060	270	1610	−21	—	—
Hexyl Epoxystearate (Commercial)	2575	300	1270	−47	18.8	2.74
Controls						
DOP + 1 Part $PbCO_3$	3030	390	1300	−28	6.0	1.09
TCP + 1 Part $PbCO_3$	3630	295	2010	0	0.5	0.26

[a] Weight loss is actual loss in weight per 100 grams of milled and molded sheet.
[b] Epoxidized Butyl Esters of Tall Oil Fatty Acids.

Table I

Berg temperatures, as might have been expected from the higher 100% modulus and the low elongations that they exhibit. The effect of branching on the low temperature flexibility is illustrated by a comparison of hexyl- and 2-ethylbutyl epoxystearates. The branched chain compound has a stiffening temperature of -55° C compared to -47° C for the unbranched.

A close examination of a plot of apparent modulus of elasticity in torsion vs. temperature reveals distinct differences among the epoxy esters. Aliphatic esters containing a single ester and oxirane group are characterized by the smallest change in modulus with temperature. The moduli of the formulations containing aromatic monoesters, aliphatic diesters, and the triesters of low molecular weight show a much greater dependence on temperature. The curve for DOP shows a similar shape. A third type of change is characteristic of the triesters of high molecular weight. A narrow transition region exists in going from a rigid to the elastic state. A large change in modulus takes place over a relatively small temperature range. TCP exhibits a similar type of curve. The fact that a compound shows a good low temperature flexibility does not in itself mean that its rate of change in modulus will be small.

Migration: For many uses of vinyl resins migration of the plasticizer is important because a loss of plasticizer is reflected in loss in flexibility and other desirable characteristics, as well as in producing an undesirable effect on the surface with which the resin is in contact. The migration tendencies of some of the epoxy plasticizers are also shown in the table given earlier. The epoxy esters of low molecular weight show a large migration, as would be expected. The weight loss after 14 days is approximately 20% for butyl-, hexyl, and 2-ethylbutyl epoxystearates. The epoxy triesters of low molecular weight (epoxidized diacetoglycerides) show a weight loss of only 6-10%, which is in the same range found for DOP.

The migration rate of triesters of high molecular weight (epoxidized soybean oil) is only slightly less than that of the triesters of low molecular weight and DOP. None of the compounds approach the very low rate of migration of TCP.

Volatility: Another way in which a plasticized resin can lose plasticizer is through volatilization. The volatility of some of the epoxy esters incorporated in the copolymer is also shown Table I. The epoxy plasticizers of low molecular weight have the largest percentage weight losses. Butyl- and hexyl epoxystearates lose 3.6% and 2.7% respectively, the loss decreasing with increasing molecular weight (and boiling point). The branched isomer of hexyl epoxystearate, 2-ethylbutyl epoxystearate, loses somewhat less, 1.5%. These compounds have a greater loss than does DOP (1.09%), but the loss for epoxidized diacetomonolein is almost identical. The epoxidized diacetomonoglycerides of soybean and cottonseed oils, on the other hand, are one-eighth to one-ninth as volatile as butyl and hexyl epoxystearates, and one-third that of DOP. The weight loss of epoxidized soybean oils

EFFECT OF LIGHT ON MECHANICAL PROPERTIES

Epoxy Ester	Unexposed Samples			Exposed 24 Hours			Exposed 120 Hours			Exposed 264 Hours		
	Tensile Strength	Elongation	100% Modulus	Tensile Strength	Elongation	100% Modulus	Tensile Strength	Elongation	100% Modulus	Tensile Strength	Elongation	100% Modulus
Butyl Epoxystearate	2680	330	1190	2450	300	1250	1850	210	1150	1660	170	1340
Butyl Epoxystearate + 1 Part $PbCO_3$	2650	355	1140	2700	330	1250	2250	255	1230	1700	150	1270
Epoxidized Diacetomonoolein	3160	360	1490	2990	360	1550	2670	300	1650	2520	230	1810
Epoxidized Soybean Oil	3020	310	1600	2810	280	1670	2710	280	1670	2910	310	1970
Control												
DOP + 1 Part $PbCO_3$	3270	330	1590	2850	250	1650	2340	200	1570	2240	135	1890

Table II

is 0.2-0.3%, slightly less than that of the diacetomonoglycerides. Epoxidized soybean oil, epoxidized diaceto compounds, and TCP have similar volatilities.

Light Aging: The effect of light on the color, mechanical properties and solubility of molded specimens is also of importance. In the work being described exposure was carried out in an Atlas Twin Arc WeatherOmeter. The specimens are necessarily heated during this exposure; temperatures range from 70-75° C. The specimens are examined at regular intervals, first for change in color. The time given is that at which the samples become distinctly yellow. At the end of 192 hours none of the epoxy compounds develops a pronounced color, whereas DOP and TCP have after 72 and 24 hours respectively. Some of the specimens plasticized with epoxy esters develop a slight yellow color after milling and molding (no heat stabilizer used in the formulation). This always disappears after a few hours' exposure.

The surfaces of the plasticized sheets are examined periodically for tackiness, exudation, and blistering. After about 72 hours' exposure, most of the compounded sheets have or develop a greasy surface. On some it is not immediately evident but show up on standing at room temperature. The surface of the stock plasticized with DOP becomes tacky after only 24 hours.

The incorporation of lead carbonate into the stocks does not eliminate the greasiness but the addition of as little as 0.25% of disodium hydrogen phosphate or trisodium phosphate has a marked effect. For example, a stock plasticized with the relatively volatile butyl epoxystearate but containing 0.25% of disodium hydrogen phosphate shows no surface exudation after 264 hours and only relatively few blisters. The surface of the sheet also retains high gloss, and no change in its stabilizing action is effected. After 4 months' standing at room temperature the sample is unchanged in appearance.

The effect of light on the mechanical properties is given in Table II for one member of each class of epoxy ester investigated. Similar data are included for a specimen containing DOP. The per cent change in tensile strength of the specimens containing epoxy esters appears to depend on the molecular weight of the plasticizer and the length of exposure. The epoxy ester of low molecular weight, butyl epoxystearate, shows a decrease of 38%, epoxidized diacetomonoolein 20% and epoxidized soybean oil less 4% after exposure for 264 hours. DOP shows approximately the same decrease (32%) as do the epoxy compounds of lowest molecular weight.

A similar situation is observed for the decrease in elongation. Butyl epoxystearate and DOP show about a 60% decrease, while epoxidized diacetomonoolein decreases about 35%. The epoxidized soybean oils show no change.

The change in 100% modulus ranges between 12 and 22% for all the specimens. The addition of 1% of lead carbonate to the specimen plasticized with butyl epoxystearate slows down the rate of decrease in tensile and elongation.

Specimens containing epoxy esters remain completely soluble even after 264 hours exposure. Specimens plasticized with DOP have very different solubility characteristics. They are completely soluble after 24 hours exposure and almost completely insoluble at the end of 264 hours.

These results show that in the presence of an epoxy ester, polyvinyl chloride probably does not cross link on exposure to ultraviolet light. If it does, chain degradation must also be a predominant reaction. This is not the case, however, when DOP is used with lead carbonate stabilizer. Here, crosslinking is predominating.

Heat Aging: Heat stability of plasticized specimens as judged by color change varies considerably even for different preparations of the same plasticizer. The majority of the transparent, almost colorless, plasticized sheets containing epoxy esters are transformed into transparent yellow or orange sheets after 7 hours at 160° C. Stocks plasticized with DOP and TCP (1% lead carbonate used) become intensely brown after 4 and 2 hours, respectively, under the same conditions.

Plasticization of PVC: Because of the increasing tendency to utilize the homopolymer, polyvinyl chloride, instead of a copolymer, some data are available on the evaluation of epoxy esters with the homopolymer. The data are similar to those already reported for the copolymer. The epoxy esters, also, can be easily milled between 300 and 330° F.

The outstanding low temperature epoxy plasticizer-stabilizers for polyvinyl chloride and its copolymers are the 2-ethylbutyl epoxy-stearate, epoxidized butyl esters of tall oil fatty acids, and methoxyethyl-, acetoxyethyl-, glycidyl-, tetrahydrofurfuryl-, cyclohexyl-, phenyl-, and benzyl epoxystearates. Epoxidized diacetoglycerides are all-purpose plasticizers, comparable in most respects to DOP. In addition, they are excellent light stabilizers. Above 140° C epoxy esters are relatively ineffective as heat stabilizers.

AUTOMATIC BATCHING

Novel system for automatically compounding batches of coating material in mixing tanks by weighing the tanks electrically on load cells is discussed in this article

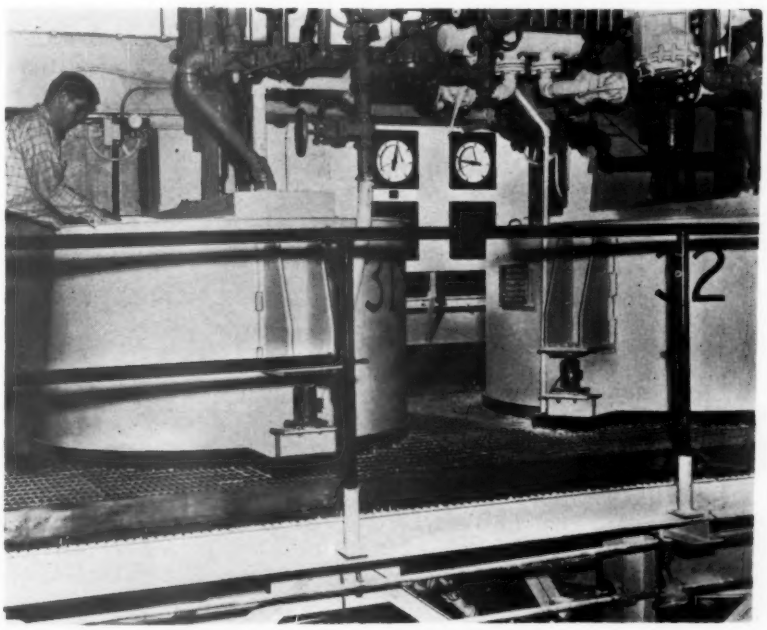
THE key to automation in the formulation of coatings for "SuperSanitas" fabric wall coverings has been found in the use of electrical transducers of weight. The problem at *Standard Coated Products Company, Buchanan, N. Y.* involved economical production in increasing volume for a new and improved plastic coated fabric wall covering and, more importantly, quality control through uniformity in the production of the coating material.

The new method of automatic proportioning controls the weight of the liquid and solid ingredients that flow into 1500-gallon mixing tanks. It has greatly reduced the amount of laboratory analysis while increasing the efficiency and accuracy of repetitive production of the large batches required to meet growing demands.

Weight transducers, the heart of this system for 1500 and 1000-gallon tanks, are three precision-type load cells* of 10,000-lb. capacity each on which the tanks rest. The principle of the bonded resistance wire strain gage, utilized in these cells, permits remote electrical measurement, indication, and recording of weight, as well as use of the signal by a controller to operate equipment associated with materials being weighed.

Instrumentation includes five timers by which the duration of each mixing cycle is set. Weighing and mixing proceed simultaneously and independently in response to electrical signals from load cells and timers, causing the opening and closing of valves in three feed lines of the liquid products flowing into the mixing tank, the starting and stopping of a conveyor which carries pulverized clay into the tank, and starting and stopping mixing action in accordance with the present time schedule.

(*Turn to page 103*)



Courtesy of Baldwin-Lima-Hamilton Corp.

For automatic formulation of latex coatings one 1500-gallon and one 1000-gallon mixing tanks are supported on load cells which serve as electrical weight transducers for controlling quantities of ingredients flowing into tank. Panel behind tanks controls quantities of ingredients and time the mixing cycles. Operator is shown removing samples for laboratory check before emptying mixer.

*Baldwin SR-4 load cell manufactured by Baldwin-Lima-Hamilton Corp., Philadelphia, Pa.

NEWS

Latex Films Discussed By Edward J. Dunn, Jr.

"The Physical Properties of Latex Paints" were discussed by Edward J. Dunn, Jr., at last month's meeting of the New York Paint and Varnish Production Club. Mr. Dunn is department head of the physical measurements department of the National Lead research laboratories, Brooklyn, N.Y., and secretary of the New York Club's technical committee.

Among the guests at the meeting was Bob Matlack, past president of the Federation, who introduced Erich V. Schmid, of the George Fey Co., Switzerland. Mr. Schmid is the incumbent president of FATIPEC, the association of paint technologists in western continental Europe.

E. J. [Dunn

E. V. Schmid

The Club elected the following officers to preside during the year 1956-1957: President: Ernest S. Paterno; Vice President: E. J. Dunn, Jr.; Secretary: Moe Bauman; Treasurer: Ben Chatzinoff.

Mr. Dunn reported that in his laboratories the mechanism of latex film formation was studied microscopically and through the use of movies taken through the microscope. The latex systems studied were styrene-butadiene, acrylic, PVA copolymer, aystems studied PVA copolymer, and post plasticized PVA homopolymer emulsions. It was observed that in all final dried latex films there was no evidence of a continuous film such as would be obtained with an oil base paint. The incorporation of so called "fusion agents" did not cause fusion in any of the systems, although their use did tend to

(*Turn to page 97*)

TAKING VISITORS ON TOUR: Benjamin Farber (third from left), president of Farnow, Inc., Long Island City, N.Y., recently played host to Gustav Labitzke Erben (left) and Dr. A. Lehmann (right), of G. Labitzke Erben, Zurich, Switzerland. Dr. Majer Landau (second, right), of Quigley Co., Inc., South River, N.J., escorted the distinguished foreign visitors. Mr. Farber conducted the visitors through his plant showing them Farnow's modern method of material handling using fork lift trucks as prime movers of solids and drums, as well as the pump system for liquid materials. The visitors, who are in this country to study American methods of paint and varnish manufacturing, were also shown Farnow's set kettles, and discussed alkyd manufacturing methods of operation and control. The tour extended to an inspection of the company's research, control and paint laboratories.

St. Louis Club Ends Season

The St. Louis Paint and Varnish Production Club on May 15 held its last meeting of the year until the Fall season. Guest speaker was C. J. Meeske, director of research, surface coating resins, for Reichhold Chemicals, Inc., White Plains, N.Y.

Luminescent Pigments

The United States Radium Corp. has entered into an agreement to take over from the New Jersey Zinc. Co. its luminescent pigment business. These materials will be manufactured at Radium's Whippany, N. J. plant and marketed under its "Helecon" trademark.

VISITORS FROM ABROAD: This group of foreign paint manufacturers visited Columbian Carbon Co., New York City recently. They are touring the United States under the joint auspices of the U.S. Department of Commerce, National Paint, Varnish and Lacquer Association and the German publication "Farbe und Lack," and with the assistance of the Trade and Industry Tours Association. The group, photographed in Columbian's conference room, included: Rolf Hecker and Ignatz Latzen, Spies Hecker & Co.; Dr. Walter Maeder, Lack-und Farbenfabrik; Dr. C. Dold, Hans Dold & Co.; E. George Fey, St. Margrethen, Switzerland; Rolf Merz, Merz & Co.; Dr. F. Ruebel, Werner Grohmann, A.G.; Wolfgang Hemmelrath, Hemmelrath & Co., Lackfabrik GmbH, and Dr. Alphonse Schoch. The group is shown with Dr. Stresino and Kenneth Wade of Columbian.

NEWS

NDSC to Give Advanced Paint Short Course

The Sixth Advanced Paint Refresher Course will be given July 16-27 at the North Dakota State College, Department of Paints, Varnishes and Lacquers, Fargo, N.D.

According to Dr. Wouter Bosch, professor and chairman of the department, these other short courses will also be given: Ninth Paint Short Course for Beginners, July 2-13, and Second Maintenance Coatings Short Course, July 30-Aug. 4.

Following is the schedule for the Sixth Advanced Paint Refresher Course:

July 16—"Welcome," Dr. Fred S. Hultz, president, North Dakota State College; "Announcements, Introductions," Dr. Bosch; "Chemistry of Drying Oils," Dr. Bosch.

July 17—"Vegetable and Marine Drying Oils—Refining, Processing and Uses in Paint Formulation," James V. Porter, technical sales service department, Archer-Daniels-Midland Co., Minneapolis.

July 18—"Properties and Formulations of Synthetic Resins in Oleo-resinous Varnishes and Their Uses and Application in Finishing Materials," George T. Sohl, technical representative, resinous products division, Rohm and Haas Co., Philadelphia; "The Chemistry of Alkyd Resins," Dr. Bosch; "Isophthalic Reaction Characteristics," Dr. R. W. Stephenson, marketing specialist, Oronite Chemical Co., San Francisco.

July 19—"Amino Resins," Dr. Bosch; "Theoretical Aspects of Emulsion Polymerization and Film Formation from Latexes," Dr. John W. Vanderhoff, chemist, physical research laboratory, The Dow Chemical Co., Midland, Mich.

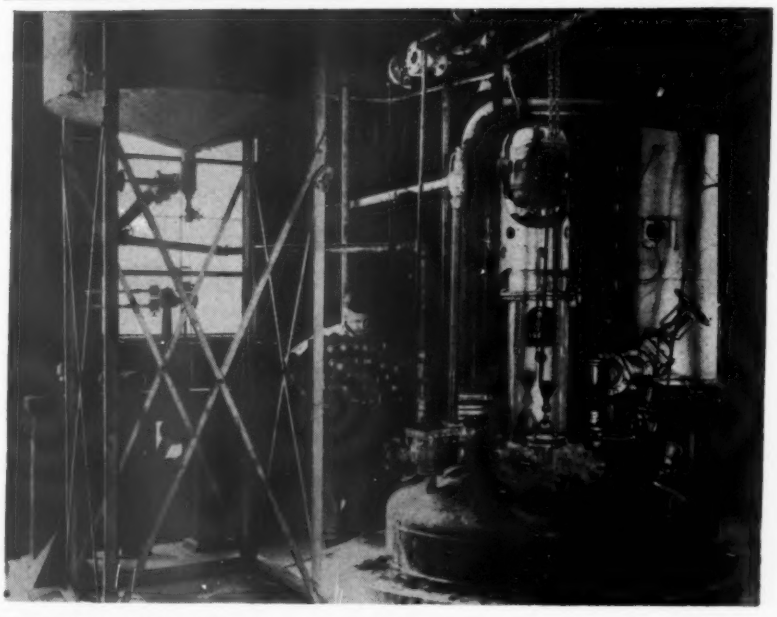
July 20—"Latexes for Latex Paints," Fred K. Quigley, Jr., head, technical service and development activities for latex paints, plastics department, The Dow Chemical Co.; "White Pigments—Their Properties and Uses," Jim

(*Turn to page 97*)

FOR RESEARCH: Eighteen paint manufacturers recently joined together for the purpose of carrying out co-operative research and the result was the formation of Coatings Research Group, Inc. Headquarters of the laboratory are located at 4712 Bethesda Ave., Bethesda 14, Md. Work will be directed by John C. Moore, formerly technical director of the National Paint, Varnish and Lacquer Association. Officers of the new group are: Horace S. Felton, president; Byron F. Swackhamer, vice president; Hiram P. Ball, treasurer, and Howard Berman, secretary. Those in photo above are, back row (right to left), John C. Moore, John J. King, John E. Lamontagne, E. L. Gott, and C. Burch Athey. Seated (right to left), Frank Gerke, Walter O. Schwarz, Hiram P. Ball, Byron F. Swackhamer, Horace S. Felton, Richard W. Brown, E. G. Carlson, L. O. Hawkinson, F. John Derrick, Denison W. Greene, John G. McMurtry and Howard Berman.

Cite Paint Industry Appeal

In a recent appeal to the students of Cypress-Fairbanks High School, Otto Hartwick of the Houston Paint and Varnish Production Club cited the opportunities to be gained in the field of science and engineering, with particular emphasis on the protective coatings industry. His talk was punctuated with a series of illustrative and spectacular chemical experiments as well as with a thirty-minute movie on the paint and varnish industry.



PINE OLEORESIN: The first commercial processing plant for the continuous distillation and refining of pine oleoresin in this country has been constructed by Pine Chemicals, Inc., a few miles south of Trenton, N.J. on the east bank of the Delaware River. Photo shows top of one of the stainless steel, oil fired resin reactors, designed and built to the company's specifications. Secondary chemicals are weighed in tank at left. Finished product, hot liquid resin, is blown from reactor to packaging area.

NEWS

Gordon Conference To be Held July 16-20

The Gordon Research Conference on Organic Coatings will be held July 16-20 at the New Hampton School, New Hampton, N.H. Sponsored by the American Association for the Advancement of Science, this will be the 25th anniversary for the Gordon Conference and the sixth consecutive year in which an Organic Coatings Conference has been held.

Attendance is open to all in the field and those interested can write to Dr. George W. Parks, Director of the Gordon Research Conferences, at the Department of Chemistry, University of Rhode Island, Kingston, R.I.

Following is the complete Organic Coatings Conference program:

July 16—Morning "The Statistical Approach to Coatings Problems," Herman B. Wagner, Rutgers University; Evening: Case Histories of Statistics Applied in Coatings," Panel Discussion. R. L. Hawkins, Jr., Empire Varnish Co.; S. C. Horning, E. I. du Pont de Nemours & Co., and W. C. Schickner, Battelle Memorial Institute.

July 17—Morning: "Adhesion of Organic Coatings to Metal Substrates," W. K. Asbeck, Carbide and Carbon Chemicals Co.; Evening: "Adhesion of Organic Coatings to Wood Substrates," G. G. Sward, National Paint, Varnish and Lacquer Association.

July 18—Morning: "Microscopy of Heterogeneous Polymeric Systems," E. H. Merz, Monsanto Chemical Co.; Evening: "Cellulose Derivative-Solvent Interaction," W. R. Moore, Technical College, Bradford, England.

July 19—Morning: "Alkyd-Amine Resin Interactions," Henry Yuska, Interchemical Corp.; Evening: "Pentaerythritol Reactions in Coating Resins," W. D. Coder, Hercules Powder Co.

July 20—Morning: "Recent Developments in Silicone Coatings," F. J. Modic, General Electric Co.

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Defense Dept. May Get Paint Responsibility

Congress may this year restore to the Department of Defense final authority to decide whether paint manufacturing and other commercial type activities of the military which compete with private industry are to be discontinued.

Before passing the $33.6 billion annual defense appropriation bill, the House voted to strike down section 633 (formerly section 638), which placed a veto power in the hands of the congressional appropriations committee to block plans of the department to get out of commercial activities.

There is still the possibility that Senate will restore the controversial section to the bill, but the heavy House vote against it (222 to 156), makes it doubtful that the Senate's views would prevail in the final test.

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Risdon Mfg. Appoints

The Risdon Manufacturing Co., Naugatuck, Conn., has announced the appointment of Walter C. Beard, Jr., to the newly created post of director of research. In his new position, he will supervise the development of new product lines and continue to devote time to valves and processes for pressurized packaging.

Time Flies in ATLAS Weather-Ometers

Write for complete Weather-Ometer® catalog.

In developing new paint products—the new Atlas Weather-Ometer Model DMC will give accurate dependable forecasts of the weathering durability and color fastness of the product. Test programs can be exactly duplicated at any time to give accurate comparative data of various formulas.

For quality control in production — the Weather-Ometer is useful in maintaining the quality standard of the product, by checking each batch run for any deviation from the established weathering and light fastness standards.

Accuracy in test results is greatly increased in the DMC Weather-Ometer by a positive control of specimen temperatures. Automatic humidity control up to dew point is available as optional equipment.

Both horizontal and vertical testing is available. Shallow containers are used for semi-liquid material and vertical panels for solids.

All automatic controls including complete voltage controls are located on the front panel above the test chamber door. Source of light is two Atlas enclosed violet carbon arcs.

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NEWS

Loucks Named NPVLA Technical Director

Charles E. Loucks has been appointed technical director of the National Paint, Varnish & Lacquer Association. He will direct and handle all technical and scientific work. The appointment was announced by Gen. Joseph F. Battley, president of the association, following the quarterly meeting of the executive committee.

C. E. Loucks

Gen. Loucks first got national recognition when, as a colonel with the U. S. Forces in England, he made the study of German incendiary bomb warfare which led to the adoption of the U. S. incendiary program.

He was called back to this country to design and produce the U. S. version of the fire bomb. He helped select Denver as the site for the Rocky Mountain Arsenal. On its completion, he was promoted to Brigadier General and assigned command of the plant. The arsenal produced the army's incendiary bombs.

Gen. Loucks was born in Palo Alto, Calif. and graduated from Stanford University with a B. S. in 1931. He received a Master of Science degree in Chemical Engineering from Massachusetts Institute of Technology.

He served as technical director of chemical warfare research and development in Edgewood Arsenal, Maryland from 1935 to 1939 and graduated from the Army Industrial College in 1940. He also served as Assistant Military Attache in Paris and London and served in the important position of Chief, Chemical Division, European Command, Heidelberg, Germany. He became Chief of the Industrial Division of the Office of the Chief, Chemical Corps, Washington, D. C., and after World War II returned to that office as Chief of Research and Engineering Division.

In recognition of outstanding ability, Loucks was appointed Major General in the United States Army and finished his military career in May, 1955 as Deputy Chief, Army Chemical Corps, Washington, D. C.

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Appoint Jesse S. Young Co.

Bonner Chemicals, Inc., a Division of Bay State Chemical Co., Inc., has announced the appointment of The Jesse S. Young Co., Inc., New York City as its exclusive representative in the metropolitan New York-New Jersey area.

New G. E. Training Course

A new slidefilm instruction course designed to aid in the training of industrial personnel in the selection and application of modern electric and electronic control equipment has been made available by the General Electric Co.

To be used for the indoctrination of both technical and non-technical personnel, the course is composed of eight 35 mm color slidefilms and recordings which treat virtually every common aspect of control. It also includes an instructor's manual (GEA-6523) and eight review booklets which contain the script and illustrations from the films.

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- **Maskit #2 makes your paint *preferred* by painters, home owners, industry and institutional men.**
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NEWS

Discuss Synthetic Latex Polymers at Seminar

The chemical division of Goodyear Tire & Rubber Co. last month sponsored a "Technical Seminar on Synthetic Latex Polymers." The seminar was held May 4 at the Georgia Institute of Technology.

Following are the papers athat were presented:

"The Synthetic Latex Industry," H. R. Thies, general manager, chemical division.

"Theoretical Consideration of Polymerization and Latex Characteristics," J. D. D'Ianni, assistant to the vice president, research and development.

"Properties of Latex Systems and Evaluation Procedures," W.C. Smith, section head, latex and adhesives, chemical materials development department.

"The Course of Product Development," J. D. D'Ianni.

"Sources of Materials for Latex Manufacture," A. E. Polson, manager, plastics department, chemical division.

"The Production of Synthetic Latex," A. E. Polson.

"The Influence of Latex Variants on Important Performance Characteristics," W. C. Smith.

"Types of Latex Commercially Available," A. E. Polson.

"A Survey of Latex Applications and Potentials," E. W. Scott, sales service representative, coatings department, chemical division.

"Summation," H. R. Thies.

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ASTM Announces Varied Program for Annual Meet

Forty leading manufacturers and distributors from the United States and Canada, including representatives of European companies, will take part in the 12 Exhibit of Testing and Scientific Apparatus and Laboratory Supplies to be held in connection with the 59 Annual Meeting of the American Society for Testing Materials, June 17-22 at the Chalfonte-Haddon Hall, Atlantic City, N. J.

A feature of the program is the Edgar Marburg Lecture. Dr. C. E. Reed, general manager, silicone products department, General Electric Co., will discuss "The Industrial Chemistry Properties, and Applications of Silicones."

Dr. Reed will speak on the basic chemical structure of silicones with particular reference to their similarities and differences compared with other industrially important polymeric substances, and the physical and chemical properties of silicones leading to their industrially important applications. He will then take up processes of manufacture, the important types of silicones and their applications, ending with a look into the future of silicones in selected industries such as protective coatings, electrical, aircraft, and textile.

Among the papers to be presented at the "Session on Rheological Problems" is "Dynamic Viscosity and Shear Modulus of Molten Polystyrene as a Function of Molecular Weight," by W. P. Cox, L. E. Nielsen, and R. Keeney, Monsanto Chemical Co.

The purpose of this symposium is to develop an increased awareness that rheology plays an important research role in many fields beyond a study of methods for the measurements of the viscosity of fluids.

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No raw metal— complete inside enameling with Continental's new *Outward Curl Ring*

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This improved container is made with the Tripletite friction ring curled outside the can. Every square inch of inside surface is enameled—and your paints never touch raw metal. In addition, you get the protection of Continental's Tripletite lid. Imagine what your salesmen can do with a story like this.

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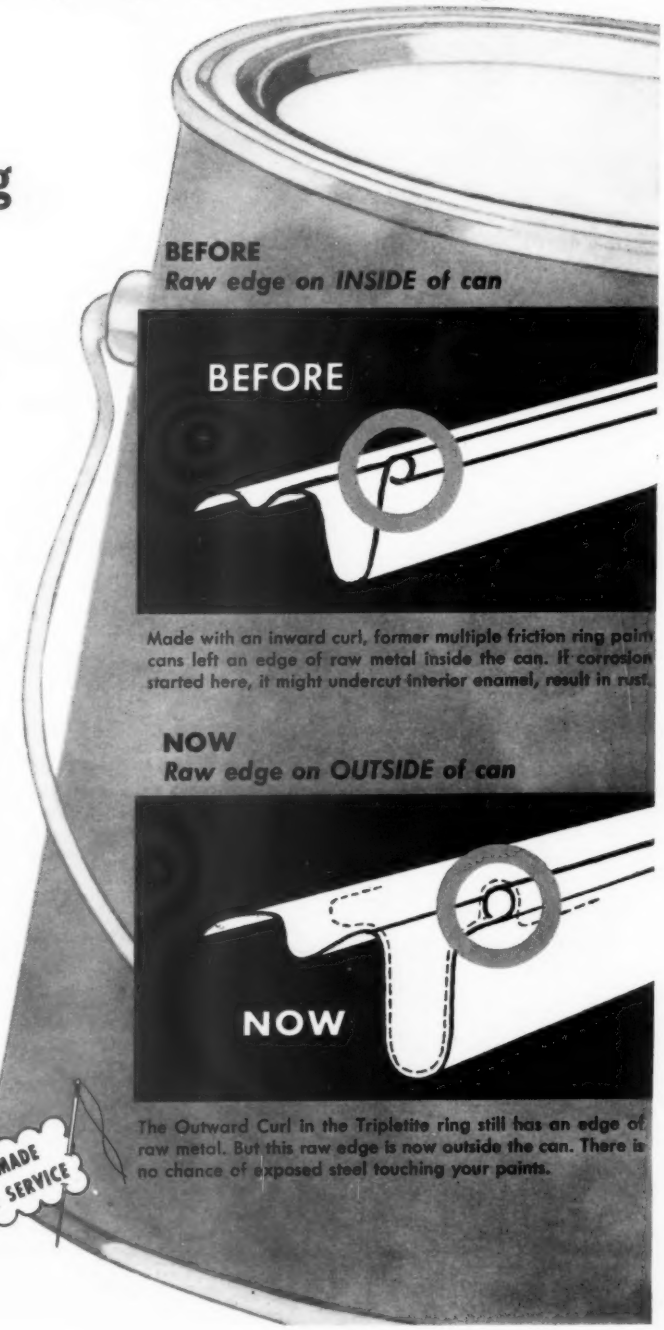
BEFORE
Raw edge on INSIDE of can
BEFORE
Made with an inward curl, former multiple friction ring paint cans left an edge of raw metal inside the can. If corrosion started here, it might undercut interior enamel, result in rust.
NOW
Raw edge on OUTSIDE of can
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The Outward Curl in the Tripletite ring still has an edge of raw metal. But this raw edge is now outside the can. There is no chance of exposed steel touching your paints.

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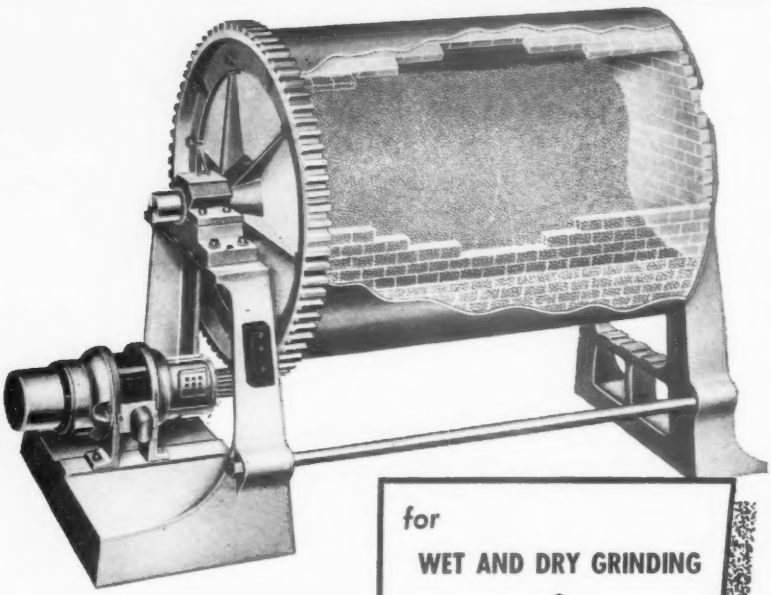

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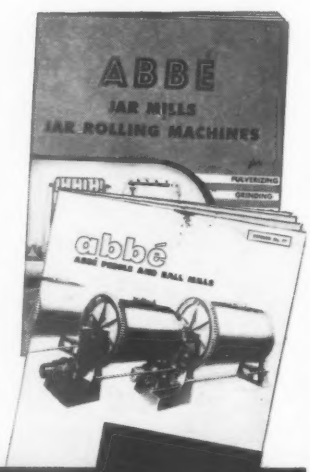
It will pay you to investigate these, as well as Abbé Jar Mills and Jar Rolling Machines, which cover every need and capacity.

Write for Catalogs 73 and 77 and complete data.



ORIGINATORS OF ABBÉ ENGINEERING CO. ABBÉ PEBBLE MILLS

ABBÉ ENGINEERING COMPANY
50 Church Street, New York 7, N. Y.

Address Department 64

NEWS

Brooklyn Polytechnic Gives Award to Stamer

Frank S. Stamer

The Polytechnic Institute of Brooklyn (N.Y.) presented its Certificate of Achievement Award last month to Frank S. Stâmer, vice president of Sapolin Paints Inc., New York City. The award was given in connection with the Institute's 100th Year Celebration in May. Mr. Stamer was cited for his accomplishments in the paint field.

•

Edward T. Gray, 86, Dies; Paint Industry Pioneer

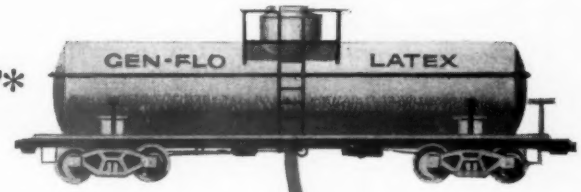
Edward T. Gray, 86, a pioneer of the paint industry, died recently at his home in Detroit, Mich.

Mr. Gray retired from Devoe & Raynolds Company, Inc., in 1940, after 58 years of continuous service. Starting with Devoe in 1882, he rose to director of the company in 1925 and later became western division manager at Chicago. He held both positions until his retirement.

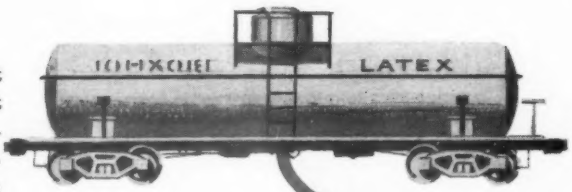
The retirement of his son, George P., as vice president of Devoe in 1955, brought to a close a total of 88 years of continuous service by father and son in the organization.

Another quality chemical by General Tire

GEN-FLO '67*



the completely interchangeable paint latex!



In-use experience by leading paint manufacturers has proven that Gen-Flo® 67 is so completely interchangeable that it is being successfully intermixed in storage with other high quality styrene butadiene latices.

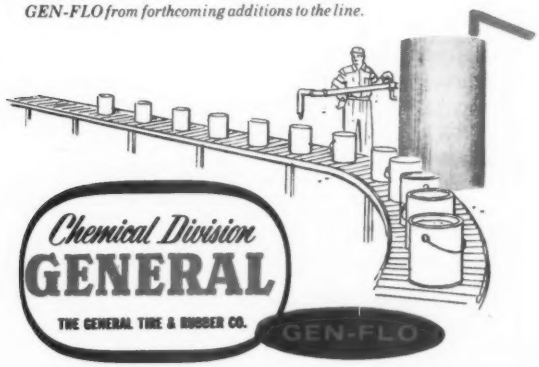
NOW YOU CAN

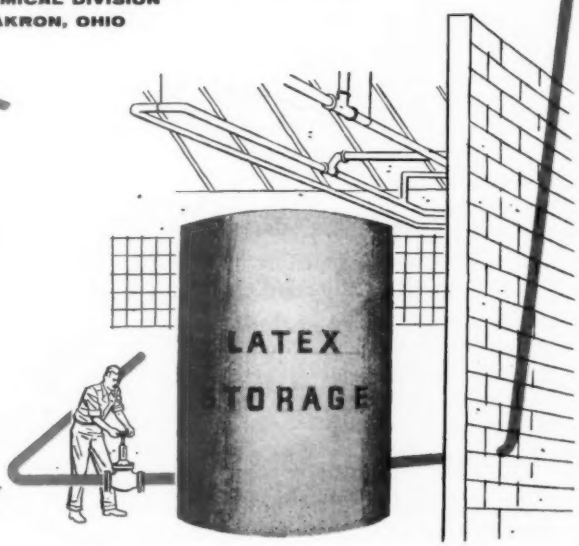
- Maintain two truly active sources of paint latex on an interchangeable basis.
- Save expense of extra storage facilities and attendant maintenance requirements.
- Decrease your inventory problems.

Try GEN-FLO Latex in your rubber-base paint formulations—it will help you "build in" excellent freeze recoverability, scrub resistance and cleansability. The close control of GEN-FLO'S particle distribution and size assures the uniformity your customers demand in latex paints. For samples, literature and technical assistance, write to The General Tire & Rubber Company, Chemical Division, Akron, Ohio.

THE GENERAL TIRE & RUBBER COMPANY
CHEMICAL DIVISION
AKRON, OHIO

* *Identification number to distinguish original GEN-FLO from forthcoming additions to the line.*





Creating Progress Through Chemistry

IMPROVE YOUR INDUSTRIAL PAINT PRODUCTS WITH *BENTONE*® 34

Durability of metal protective paints made with BENTONE **34** is proved at National Lead's Sayville, L. I. Test Station.

Here's what BENTONE **34** does for three special classes of industrial paints.

Maintenance and metal protective paints and primers. BENTONE **34** provides outstanding pigment suspension, improves working properties, reduces sag, permits thick coats. Because BENTONE **34** is moisture-resistant and repels water, film is reinforced against weathering. No sacrifice in drying time or adhesion.

Traffic paints. By providing body without slowing solvent release, BENTONE **34** permits fast set. In glass bead types, it prevents hard packing. No harm to adhesion.

Clear finishes and stains. BENTONE **34** improves brushing . . . reduces sagging, running, pooling, streaking. It controls pigment dispersion and suspension, promotes uniformity, steps up package stability.

Improves mastic compounds, too

With Dutch Boy BENTONE **34**, you can make proven trade formulae even better.

By improving initial filler wetting, BENTONE **34** reduces "sweating" new batches. It minimizes oil separation or hardening in storage. It balances working properties in the compound for hot and cool weather use. It also aids moisture resistance.

BENTONE *34* Handbook details many formulations for these and other organic products. Write for a copy, as the first step towards improving your industrial paint products.

Dutch Boy® CHEMICALS

NATIONAL LEAD COMPANY

111 Broadway, New York 6, N. Y.

In Canada: CANADIAN TITANIUM PIGMENTS LIMITED
630 Dorchester Street, West, Montreal

Give your light-color alkyds

Locked-in Color Stability

with

NEO-FAT® 132

Your alkyds retain their color stability when you lock it in with Armour's Neo-Fat 132. This high stability fatty acid gives outstanding color retention. From freight car finishes to hardware enamels, your light color alkyds stay light! They dry fast too, through and through—forming an extraordinarily hard film. And because Neo-Fat 132 never varies from published specifications, your alkyds will always have the *same* uniform color and high quality.

See for yourself how Armour Neo-Fat 132 can give your alkyd a competitive advantage. Send the coupon now for a sample and for further information.

ARMOUR CHEMICAL DIVISION

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MAIL WITH YOUR LETTERHEAD TODAY!

Armour Chemical Division, 1355 W. 31st Street, Chicago 9, Illinois

Please send me:

Sample: ☐ Neo-Fat 132

Information: ☐ Formulations for Neo-Fat 132

☐ Other Armour High-Quality Fatty Acids

V-6

Name_____

Title_____

Firm_____

Address_____

City_____ Zone_____ State_____

Mr. Roger Calsibet
BAKELITE COMPANY
30 East 42nd Street, New York 17, N. Y.

☐ Please ask a technical representative to call.

☐ Please send latest Technical Bulletins on BAKELITE Brand Epoxy Resins for coatings.

*Name*_____ *Title*_____

*Company*_____

*Address*_____

*City*_____ *Zone*_____ *State*_____

TWO NEW EPOXY RESINS FOR COATINGS

BAKELITE EKRA-2002

BAKELITE EKRD-2003

FOR AIR-DRYING OR BAKING FINISHES

. . . for steel, aluminum, zinc, tin-plate, wood, masonry and other surfaces

. . . for brushing, spraying, dip-, roller-, and flow-coating application

Both BAKELITE Brand Epoxy Resin EKRA-2002 and EKRD-2003 are solid, brittle, pale-amber resins developed especially for coatings. EKRD-2003 is primarily designed for esterification. It is cooked with vegetable oil acids to provide coatings with excellent adhesion, chemical resistance, and impact resistance.

EKRA-2002 is lower melting. It is designed specifically to be reacted with various hardeners such as amines, polyamides, and urea-formaldehyde resins. However, it can also be esterified with vegetable oil acids. Coatings based on EKRA-2002 exhibit superior durability and clarity, toughness, chemical resistance, flexibility and adhesion.

Both resins are soluble in a wide variety of solvents. And, wide compatibility permits advantageous modification and blending to increase special properties. Suggested coating applications are for use as appliance coatings, floor varnishes, industrial primers and topcoats, and linings for cans, drums, tank cars, storage tanks and pipes.

You can investigate these new epoxy resins merely by calling your Bakelite Company representative, or send in the coupon for Technical Bulletins.

BAKELITE Vinyl, Polyethylene, Phenolic, and Epoxy Resins and Styrene and Vinyl Acetate Latexes for Coatings.

BAKELITE
BRAND
RESINS for COATINGS

BAKELITE COMPANY, *A Division of Union Carbide and Carbon Corporation* UCC 30 East 42nd Street, New York 17, N. Y.

The term BAKELITE and the Trefoil Symbol are registered trade-marks of UCC

Investigate new Oronite Isophthalic

FOR SUPERIOR BAKING FINISHES

Consider these advantages of Isophthalic based baking resins!

1. Greater Hardness An Isophthalic based resin produced a hardness of 50% of glass as compared to a phthalic anhydride resin which gave less than 35% of the hardness of glass.

2. Thermal Stability A leading resin manufacturer has indicated that Isophthalic resins are approximately 40 times as stable to heat as comparable phthalic anhydride resins.

3. Greater Gasoline Resistance Tests have shown excellent resistance of Isophthalic baked enamels to mineral spirits and xylenes.

4. Greater Alkali Resistance This suggests Isophthalic resins for better water emulsion formulations.

For further information on this totally new raw material contact the Oronite office nearest you.

ORONITE CHEMICAL COMPANY

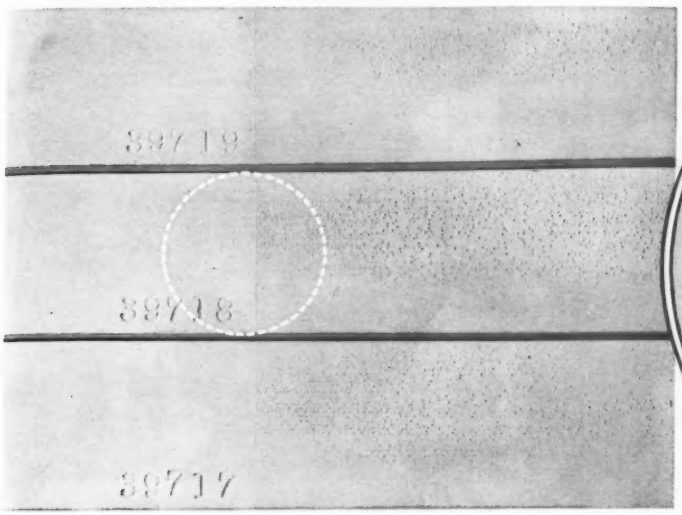
ORONITE CHEMICAL COMPANY

EXECUTIVE OFFICES: 200 Bush Street, San Francisco 20, California

SALES OFFICES

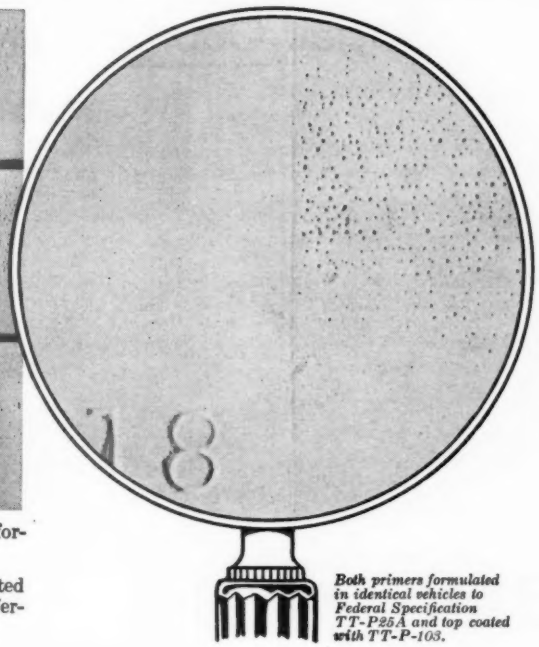
450 Mission Street, San Francisco 5, Calif. — 714 W. Olympic Blvd., Los Angeles 15, Calif.
30 Rockefeller Plaza, New York 20, N. Y. — 20 North Wacker Drive, Chicago 6, Illinois
Carew Tower, Cincinnati 2, Ohio — Mercantile Securities Bldg., Dallas 1, Texas
26 Avenue William-Favre, Geneva, Switzerland

Compare the difference in these two paint primers!



Test panels on left show that *no blistering* occurred in the paint primer formulated with Eagle-Picher Super Sublimed White Lead.

Test panels on right show definite *blistering* in the paint primer formulated with an equal volume of a highly reactive lead pigment. Compare the difference in the magnified area on extreme right.



Both primers formulated in identical vehicles to Federal Specification TT-P-25A and top coated with TT-P-103.

EAGLE-PICHER
SUPER SUBLIMED WHITE LEAD
provides greater blister resistance!

Accelerated tests prove that blistering—caused by loss of adhesion when moisture content is high—*does not occur* when quality house paint primers are formulated with Eagle-Picher Super Sublimed White Lead. Even under extremely adverse moisture conditions, these primers show very little water absorption, low volumetric swelling and superior adhesive characteristics.

Insure greater blister resistance in your house paint primers. Specify Eagle-Picher Super Sublimed White Lead. Remember, Eagle-Picher maintains rigid quality control from ore to finished pigment . . . and as the largest producer of *both* zinc and lead pigments provides unequalled and unbiased customer service!

THE FORMULATION

	Pounds per gal.
#41 Super Sublimed White Lead	4.64 lbs.
Titanium Dioxide—Rutile	1.13
Magnesium Silicate	3.41
Raw Linseed Oil	1.32
Z Linseed Oil	2.47
Mineral Spirits	1.62
24% Pb	.06
6% Mn	.03
	14.68 lbs.

PVC—35.5%

Since 1843

EAGLE EP PICHER

THE EAGLE-PICHER COMPANY

Largest Producer of Both Zinc and Lead Pigments

General Offices: Cincinnati 1, Ohio

Regional Sales Offices: Chicago, Cleveland, Dallas, New York, Philadelphia, Pittsburgh

She won't put off painting...

if your paints contain Sinclair Odorless Solvents

Offer her a paint formulated with Sinclair Odorless Solvents and you're due for more business – repeat business.

You can produce a superior odorless paint with either of Sinclair's two types of top-quality Odorless Solvents. For your protection against contamination, Sinclair maintains a fleet of special tank cars, used *exclusively* in Odorless Solvent service. Light and Heavy Odorless Solvents are available in full and split tank car quantities. Prompt shipments to meet your production requirements are assured. For samples, prices and complete information on Sinclair Odorless Solvents, write or call...

SINCLAIR ODORLESS SOLVENT LIGHT

Distillation Range
IBP...345°F. EP...400°F.
Kauri-Butanol Value...27

SINCLAIR ODORLESS SOLVENT HEAVY

Distillation Range
IBP...375°F. EP...465°F.
Kauri-Butanol Value...25

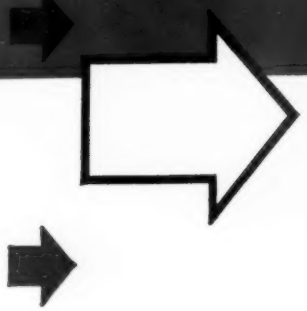
SINCLAIR CHEMICALS, INC.

(Affiliate of Sinclair Refining Company)

600 Fifth Avenue, New York 20, N. Y. • Phone Circle 6-3600
155 North Wacker Drive, Chicago 6, Illinois • Phone Financial 6-5900

AN INVITATION FROM DU PONT

that may well
provide the answer
for one of your
most important
decisions during 1956



You are invited to learn in 1 day answers that were 5 years in the making at the Du Pont Pigments Test Farm

THE Du Pont Pigments Test Farm near Wilmington, Delaware, offers one of the most complete exhibits of paint exposures in the country. More than 30,000 panels are currently under test.

Started in 1932, the farm has extensive histories on many widely used formulations. And, as new paints have been developed, test panels of these paints have been added to the fences.

Are you interested in Oil . . . PVAc . . . Alkyd . . . Acrylic?

If you are considering a new paint formulation for your line—or would like to see how formulations similar to your present paints look after many months' ex-

posure—it will be well worth your time to visit the Du Pont Pigments Test Farm.

Here, histories on PVAc—with various extenders and pigmentations . . . applied over a variety of substrates—are already more than two years old. Alkyd histories are considerably older, while, of course, acrylics are the newest.

In addition, there are extensive evaluations on various enamel systems, which include automotive, trim, and porch and deck.

How long will your tour take?

Just as long as you care to make it. One day, or two, if you have the time. At the farm, experienced personnel will show you the exposure studies you are most interested in and discuss in detail earlier findings. And just 10 miles from the test farm in Wilmington is the Sales Service Laboratory, where you can see the laboratory facilities used in studying paint problems.

Fence exposures backed up by house tests

Homes in the Wilmington area are also used in Du Pont's research activities. It is here that much valuable information is gathered on paints that have shown good promise on the fences. To many visitors, a trip to some of these houses is one of the high spots of the tour.

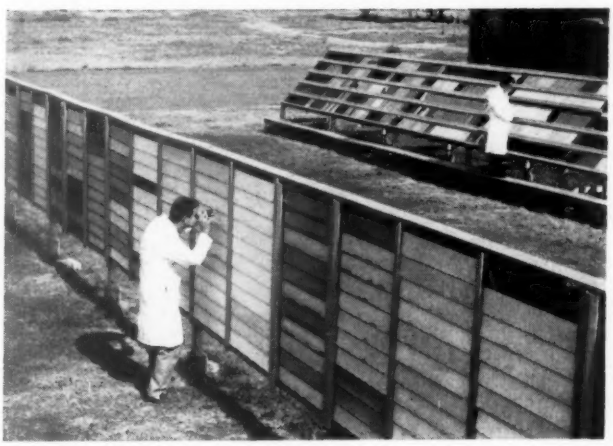
Paint farm in California serves western manufacturers

Closely related to the work being done at Wilmington is that being carried out at the paint farm in El Monte, California. Here, new formulations of particular interest to western manufacturers are tested.

If you would like to schedule a tour of either of these farms, contact your Du Pont Pigments Representative. For your convenience, addresses of regional offices are listed on the next page.

• Your tour of the Du Pont Pigments test fences can be as long as you care to make it. Here, a group of visitors is taking time to participate in a technical discussion.

• Homes in the Wilmington area play an important part in the Du Pont customer-service program. Here, in-use data is obtained on paints previously tested on the fences.



• Data gathered on the Delaware test farm is supplemented by exposures from test fences in El Monte, Calif., thus providing results under varying climatic conditions.

TODAY you can make all the necessary arrangements for your visit to the test fences by contacting your Du Pont Pigments Representative. He will gladly set up a date for you at your convenience. Call him today, you can . . .

Reach him at:

ATLANTA, GA. . . . . 225 Moore St., S. E. . . . . ALpine 5178
BOSTON (Malden 48), MASS. . .359 Washington St. . . MAlden 2-8080
CHICAGO 6, ILL. . . . . 20 North Wacker Drive . . . . . ANdover 3-7000
CLEVELAND 14, OHIO . . . 1222 Nat'l City Bank Bldg. . . . MAin 1-2994
DETROIT 35, MICH. . 13000 West Seven Mile Rd. . UNiversity 4-1963
HOUSTON 25, TEX. . . . . 1105 Prudential Bldg. . . . . JAckson 3-5533
NEW YORK 1, N. Y. . . . 1027 Empire State Bldg. . . LOngacre 3-6400
PASADENA 1, CALIF. . . . . 234 East Colorado St. . . . . RYan 1-7431
PHILADELPHIA 3, PA. . . . . 117 South 17th St. . . . RIttenhouse 6-2080
PORTLAND, OREGON. . . . 1238 N. W. Glisan St. . . . . CApitol 2-6012
SAN FRANCISCO 4, CALIF. . . . . 111 Sutter St. . . . . EXbrook 2-6230
WILMINGTON 98, DEL. . . . . 1007 Market St. . . . . OLympia 4-5121

E. I. du Pont de Nemours & Co. (Inc.) . . . Pigments Dept.

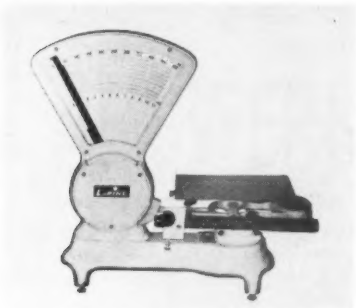
DU PONT
REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

NEW MATERIALS & EQUIPMENT

A MONTHLY MARKET SURVEY

This section is intended to keep our readers informed of new materials and equipment. While every effort is made to include only reputable products, their presence here does not constitute an official endorsement.



LA PINE

SELF-BALANCING SCALE
Automatic Type

Between two and four seconds, the company says, is the normal weighing time with an automatic self-balancing scale that has just been added to its line of balances. The weight can be read to 1 gram or 1/100 lb directly on the indicating dial without taking time to balance loose weights and beam poises. High-speed weighing is claimed furthered by an adjustable hydraulic damper which brings the indicator to rest in 2½ oscillations.

The dial reads weight to 500 grams or 1.1 lb. The total capacity of 5,000 grams or 11.1 lb is attained with a poise sliding on a notched beam. Scale sensitivity is ¼ gram, and accuracy is 1/100 of 1 per cent of full scale, according to the company. Arthur S. La Pine & Co., 6001 S. Knox Ave., Chicago 29, Ill.

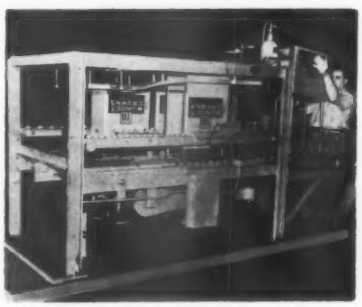
STIRRER
Low Speed Operation

Developed especially for use in flash point tests, the Slo-Speed Stirrer is said to be adaptable to any laboratory procedure requiring stirring at a slow, constant speed. Geared for a speed of 78 rpm, when used on direct drive, the stirrer also provides for a variety of speeds through the use of several pulleys, according to the company.

The motor draws 15 watts and has a high starting torque (9/10 in.-lb.). Claimed capable of operating in any position, the stirrer is fitted with a special clamp which permits the unit to be locked at the desired angle. Precision Scientific Co., 3737 W. Cortland St., Chicago 47, Ill.

BOTTOM-FLAP GLUER
Saves Shut Down Time

New carton bottom-flap gluer incorporates the "closed glue system" to save shut down time, the company says. One of the several features claimed for the "Bottoms Up" glue sealer is that the closed-system eliminates exposed glue pots and glue rolls and requires no shut-down clean-up and no glue-filling to start again. General Corrugated Machinery Co., 141 West Central Blvd., Palisades Park, N.J.



GENERAL

TRIMETHYLOLPROPANE
Varied Uses

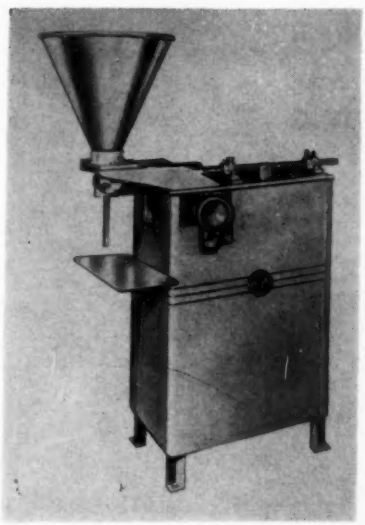
Commercial production of pure-grade flake trimethylolpropane has been announced by the chemical division. Product is an important component in production of polyurethanes and alkyd resins. In addition, it offers significant potential in synthetic drying oils, plasticizers, surface active agents and polyesters, according to the company.

In alkyd-base baking enamels, trimethylolpropane contributes to better adhesion, color, color retention and hardness. It also affords greater mixing ease in compounding polyesters and pre-polymers with di-isocyanates, the manufacturer states. Celanese Corporation of America, 180 Madison Ave., New York 16, N. Y.

FILLING MACHINE
Small Floor Model

A small filling machine (45" long x 29" wide x 63" high and weighing 400 lbs), can be used for paints and enamels, adhesives, oils, and any other liquid, viscous or semi-solid products, according to the manufacturer. Company claims this machine can be used for small operations, pilot runs, laboratory testing, small batch runs and short production runs of certain colors or products. Among the features claimed for this unit are: micrometer type full range quantity adjustment of piston stroke while machine is running; motor with variable speed adjustment; easily disassembled and cleaned, and adjustable shelf for operator's convenience when container size is changed. Hope Machine Co., 9400 State Rd., Philadelphia 14, Pa.

HOPE



WE HAD A PROBLEM

We wanted to assure 6-hour drying time for a non-yellowing, fumeproof, white architectural enamel. We also wanted to be certain that, if the paint remained on the dealer's shelves for six months or longer, it would still have this 6-hour drying time.

WE WENT TO NUODEX

We called upon their laboratory research facilities. To assure the 6-hour drying time, a number of drier combinations were prepared and tested; the best of these was then tested with two different concentrations of Nuact® Paste—to prevent loss-of-dry in storage. The final recommendation was a special Cobalt-Manganese drier combination, with a particular concentration of Nuact Paste. We saved ourselves a great deal of time and are well satisfied with the results.

YOU ARE INVITED

Nuodex invites you to call upon them for cooperative research on any paint problem—whether in current production or in new formulas, new vehicles, new developments of any type. This cooperative approach has proved mutually valuable on many occasions—an improved product for the paint manufacturer—another satisfied customer for Nuodex.

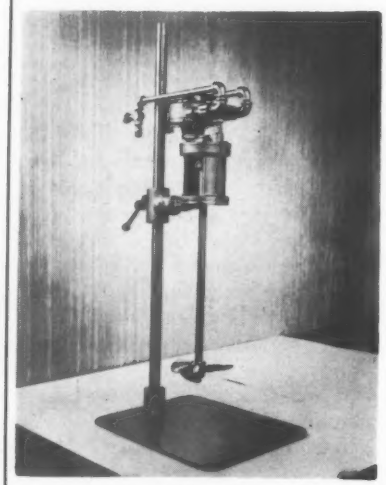
NUODEX PRODUCTS COMPANY

342 MADISON AVE., NEW YORK 17, N. Y.
A DIVISION OF HEYDEN CHEMICAL CORPORATION

NEW MATERIALS — EQUIPMENT

TRIALLYL CITRATE
Cross-Linking Agent

Triallyl citrate, a derivative of citric acid, is said to be particularly useful in the plastics industry as a cross-linking agent for polyester resins. A highly unsaturated, reactive monomer which may be polymerized to hard, brittle thermoset polymers, triallyl citrate is immiscible with water and miscible with acetone, benzene, chloroform, dioxane, ethanol and glacial acetic acid. Chas. Pfizer & Co., Inc., 630 Flushing Ave., Brooklyn 6. N. Y.



ECLIPSE

AGITATOR
For Viscous Materials

A new heavy duty bench type agitator, the "DL Pneumix," for mixing of viscous materials in small batches is particularly recommended by the company for handling adhesives, glues, unthinned resins, etc.

Claimed to be ideal for laboratory mixing of thick materials because it cannot overheat or burn out even if stalled, the DL uses an explosion-proof ½ hp air motor with 8:1 gear reduction. Speed of rotation is controlled by a hand throttle. Weight of unit is 20 pounds. The stand measures 12 x 15″ and supports the mixer with a hand clamp so that it may be raised or lowered on a 1″ diameter 36″ long upright. Eclipse Air Brush Co., 390 Park Ave., Newark, N. J.

PROTECTIVE SKIN CREAM
Contains Silicone

"Solucone," a heavy-duty protective skin cream for industrial use, contains silicone (dimenthy-polysiloxane) as the protective agent, in an effective vanishing base, according to the manufacturer. Product is claimed to have proved effective against irritants known to cause dermatitis, skin rash, skin drying and cracking. Company says that cases where skin disorders had already occurred, product prevented the spread, and that product is equally effective for wet or dry work. Soluol Laboratories, Inc., Natick, Rhode Island.

VINYL EMULSION
Improved Properties

"Resyn 12K-55," a new vinyl emulsion, is claimed to offer the following improved properties for paint formulations: excellent color development for both water and alkyd dispersed colors; excellent color uniformity over surfaces of varying porosity; no film fusion additives necessary for paints applied at normal room temperatures; excellent film fusion and color uniformity at temperatures down to 40° F. with minimum amount of film fusion agent; excellent freeze-thaw stability when formulated with film fusion agents; excellent leveling and stain removal properties; higher pigment binding capacity; borax compatibility; excellent aging stability, and low residual monomer content. Resin Div., National Starch Products, 270 Madison Ave., New York 16, N. Y.

ACRYLIC EMULSION
Special Uses

Company announces the development of "Wicaset EHF," a special purpose film forming emulsion of the acrylic type. The polymeric material is said to fuse at 250° F. to form a tough, strong film that is resistant to hot oils, boiling water, light and heat effects. The resulting film is tasteless, odorless and flexible, according to the company. Furnished as a 50 per cent solids emulsion, product may be applied by spraying or impregnating or thickened for roller coating. Wica Chemicals, Inc., Charlotte, N. C.

in every field in which a mildewcide is required

NUODEX SUPER AD-IT® combats mildew attack —in the field of *oil, alkyd,* and *oleoresinous* paints. Super Ad-It has long been accepted by hundreds of paint manufacturers for its biological effectiveness—without effect on paint properties.

NUODEX PMA-15 is the answer for the problem of surface mildew and of bacterial spoilage—in the field of *water-based paints.* PMA-15 is an established product, tested in the laboratory and proved in actual use. It may be used in any of the standard aqueous systems—with a minimum of side effects on the finished paint.

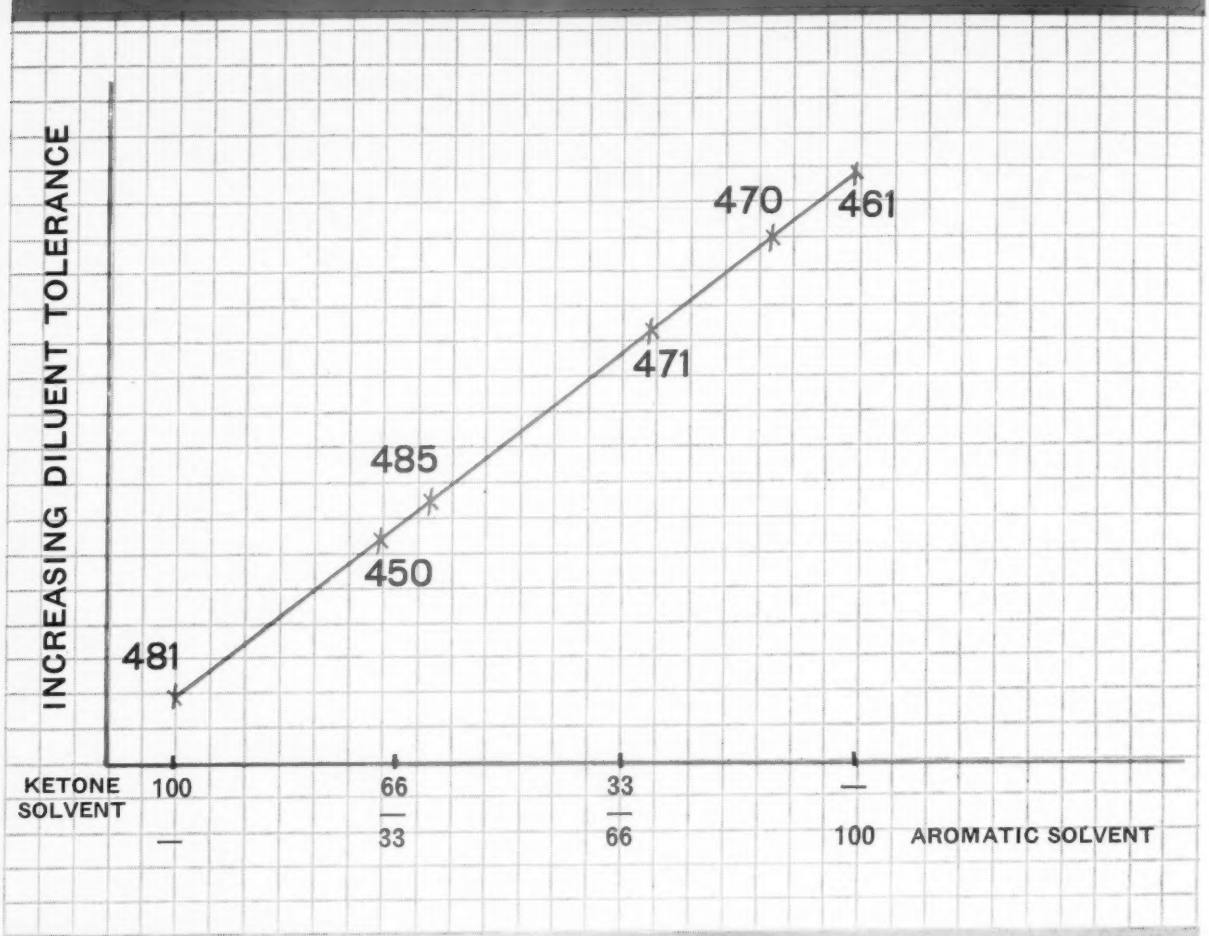
MILDEWCIDES TO YOUR SPECIFICATIONS can best answer any of your other particular application needs and processing methods. We urge you to let us know your individual requirements—for which we can specify a satisfactory fungicide—from the complete Nuodex line of *mercurials, metallo-organics,* and *organics.*

WE INVITE YOU to take advantage of the wealth of answers offered by Nuodex. Mildewcides form only a segment of a long line of Nuodex Additives which extend into every field of interest to paint manufacturers. We are ready to meet your current problems *in cooperative research with you.* Call upon this specialized Laboratory Service—either through your Nuodex Representative or by writing us direct.

NUODEX ADDITIVES

NUODEX PRODUCTS COMPANY... 342 MADISON AVENUE, NEW YORK 17, N. Y.
A Division of Heyden Chemical Corporation

EXON SOLUTION RESINS–VINYL CHLORIDE TYPE



→ pick your proper solution resin at a glance!

EXON 450—Ideal for strip coatings. Good solubility, tensile strength and durability.

EXON 461—A unique fluorine-containing resin combining high solubility, unusual chemical resistance, heat stability and weatherability.

EXON 470—Excellent adhesion to metals, alkyd and vinyl surfaces. Compatible with wide range of drying oils, alkyds, phenolics, melamines. High solubility in inexpensive solvents.

EXON 471—Excellent for weatherability and durability in a protective coating. Corrosion resistant. No measurable change after sunlamp exposure for 360 hours as 1 mil film.

EXON 481—Makes possible colorful, abrasion-proof, washable coatings that resist fading or cracking.

EXON 485—For superior strip coatings. Lower viscosity makes application easier and shelf-life better. Good clarity.

• Another Firestone service to help you make the right resin choice!

These 6 EXON solution resins are engineered precisely, varying in properties to suit various applications and uses — but never varying in quality of performance.

Further product details at left. Keep this chart handy to help you choose easily and accurately.

Firestone

For complete information and technical service, call or write:

CHEMICAL SALES DIVISION

FIRESTONE PLASTICS COMPANY, DEPT. 630 H. POTTSTOWN, PA.

A DIVISION OF THE FIRESTONE TIRE AND RUBBER COMPANY

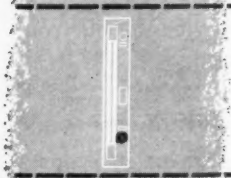
Which of these
NEW PETROMETER
Liquid Depth Gauges

best suits your installation?

You can obtain new Petrometer Series 1400 Remote Reading Tank Gauges in 4 Models to suit almost every industrial installation. All gauges operate on the sound principle of hydrostatic pressure . . . no moving parts or intricate mechanisms to cause failure through wear, corrosion or friction. Large, vertical scale gives accurate, easy-to-see readings.

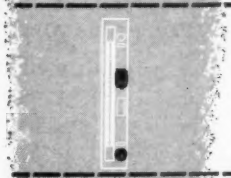
Gauges can be installed on tanks above or below the ground and up to ¼ of a mile away.

CHOOSE FROM THESE 4 MODELS



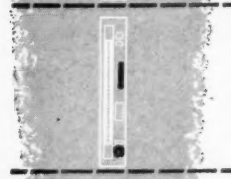
MODEL 1400 A

Equipped with aerating valve for semi-automatic purging of the transmission line. Purging line attaches to compressed air line.



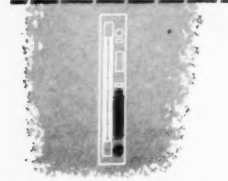
MODEL 1400 B

Equipped with Bubbler as well as aerating valve. Transparent Bubbler provides a constant visual check on aeration. Used with compressed air source.



MODEL 1400 F

Equipped with Flowmeter and aerating valve. Actual rate of flow of air for purging can be preset and indicated on the Flowmeter. Requires compressed air supply.



MODEL 1400 M

For use where compressed air source is unavailable. Equipped with Manual Air Compressor and Aerating Valve.

Petrometer Gauges can be obtained in multiple units incorporated on a single panel and mounting plate to meet your specifications. High-level — low-level alarms also available.

For complete information, send for Bulletin 6004.

Petrometer CORPORATION

43-22 TENTH STREET, LONG ISLAND CITY 1, N.Y.

NEW MATERIALS — EQUIPMENT

WEIGHTS
Meets Bur. of Stds. Specifications

Company announces the availability of a new line of weights contained in "Sto-A-Weigh" boxes. These boxes are claimed to afford the laboratory the advantage of having its weights in a hinged covered box, assuring retention of accuracy for a longer period of time. Box is fabricated from a high grade, reinforced bakelite material. Each weight, including fractional gram sizes, has a definite place in the shrink-proof box.

The weights are designed to comply with the new Bureau of Standards specifications for classes Q and P and the conventional class C. Sets are available in five different sizes and each is equipped with a pair of stainless steel forceps. Ohaus Scale Corp., 1050 Commerce Ave., Union, N. J.

ASBESTOS FIBRE
Reinforcing Ingredient

Company recommends the use of its asbestos fibres as a reinforcing ingredient, or as a stabilizer in asphalt paints, mastics, coatings, putties, caulking compounds, plastics, etc. These fibres meet the Quebec Standard Minimum Gradings for Grades 7-D, 7-K, 7-M, 7-R, 7-T and Floats (7-RF) and (7-TF). Free samples available from Grant Wilson, Inc., 141 W. Jackson Blvd., Chicago 4, Ill.

PAINT ADDITIVE
For Corrosion Control

According to the company, these "Niel-Tex" complex compounds will serve as additives, not only in making up primers and paints of all types, but in making up caulking, sealing, mastics, waterproofing and roofing compounds. The development is claimed to have produced over 500 different bases, from which has been formulated, up to the present time, over 3000 formulations of additives, some of which have proved to be very effective in paints. Also available from the company is technical data sheet No. 387 on these compounds. Nielco Laboratories, 8129 Lyndon, Detroit 38, Mich.

NEW MATERIALS — EQUIPMENT

STRIP CONVEYOR
For Storage Racks

Space-saving "live" storage is now said to be available because of a model modification made in the new Rapistan Flow Track, a rack conveyor strip.

Flow Track is the backbone of the company's Flow Rack which is used in warehousing, receiving, shipping, and as product accumulators on assembly lines. The original Flow Track was designed with wheels mounted in the track so that it could be used in any storage application, regardless of the width of the material stored.

However, the new model is designed for use in Flow Rack where the same width material is held at all times. Wheels are mounted on the sides of the track in a low position so the track itself acts as a guard rail. The Rapids-Standard Co. Inc., 342 Rapistan Building, Grand Rapids, Mich.

SULFONIC ACIDS
In Pilot Plant Quantities

Two sulfonic acids derived from palmitic and stearic acids are now available in pilot plant quantities. The alpha sulfo-stearic and alpha sulfo-palmitic acids contain a strongly ionized sulfonic acid grouping and one carboxyl group, making possible a wide variety of normal and mixed derivatives such as alkali salts, amides, esters and alkyl ammonium salts. Among the fields in which these chemicals or their derivatives appear to have promising application is butadiene styrene polymerization. Market Development Dept., Armour Chemical Div., 1355 W. 31 St., Chicago 9, Ill.

ELECTRIC HEATING CABLE
Proved Temperature of 275° F.

A new electric heating cable, "Chromalox Silicone Thermwire," is said to permit continued temperatures of 275° F. Company claims this provides an accurate method of applying or maintaining heat in pipes, vats or irregular objects where consistant high temperatures are required for controlling viscosity, chemical action and volatility in fluids. Edwin L. Wiegand Co., 7500 Thomas Blvd., Pittsburgh 8, Pa.

CALCIUM STEARATE
In Aqueous Dispersion

"Aquacal" is a stable 45 per cent aqueous dispersion of calcium stearate. A thixotropic paste, it is said to be readily diluted to any use concentration and is applicable in most processes using calcium stearate, which require (or can tolerate) the presence of water. This includes most of the following: emulsion paints, stucco and cement paints, and coatings for paper and extruded articles. It actually permits better dispersion of other dry additives in most applications, according to the company. Beacon Chemical Industries, Inc., 33 Richdale Ave., Cambridge 40, Mass.

OLEIC ACID
Light Color

A new oleic acid which is a low linoleic white oleine is marketed under the trade name "Groco 5L." The new product is said to be a premium oleic acid of extremely light color and low lineolic acid content which is claimed to give it extraordinary stability and resistance to oxidation. According to the company, recent production has resulted in oleic acids with a linoleic content well under the established maximum of 3.5 per cent. The oil has a low titre of under 5° C. and an Iodine Value of 86 max. A. Gross & Co., 295 Madison Ave., New York 17, N.Y.

ARE YOU COST CONSCIOUS?

If you are . . . and if your company manufactures

Drying Oils • Varnishes
Resins • Plasticizers
Resin-Modifiers
or Surface-Active Agents

then you should be considering the use of

Methyl Glucoside

in your process.

METHYL GLUCOSIDE is a surprisingly economical polyol having 4 esterifiable hydroxyl groups. Our laboratories are finding many new applications for this unique, highly reactive cyclic polyol. It will pay you to check with us for the latest developments in your field. Write or phone:

Chemical Division

CORN PRODUCTS REFINING COMPANY

17 BATTERY PLACE • NEW YORK 4, N. Y.

No "paint" odor with **RHOPLEX** AC-33 *acrylic* emulsion

Emulsion paints based on RHOPLEX AC-33 *acrylic* emulsion are fast-drying . . . their mild clean odor disappears almost immediately after the paint is applied. RHOPLEX AC-33 not only adds odor-free salability to your paints, but also simplifies inventory problems since this one vehicle can be used to formulate both interior and exterior paints interchangeably.

RHOPLEX AC-33 is compatible with almost all types of pigments. Paints based on this *acrylic* vehicle have excellent storage stability. There is little pH drift or viscosity change on aging. RHOPLEX AC-33 gives paints excellent durability, color retentiveness, and resistance to water-spotting and attack by alkalis. Paints can be applied by brush, roller or sprayer to a variety of surfaces—old or new, wet or dry.

For more information on the many other sales and manufacturing advantages of RHOPLEX AC-33, write for detailed literature and sample, today.

RHOPLEX AC-33 is a trade-mark, Reg. U.S. Pat. Off. and in principal foreign countries.

Chemicals for Industry

ROHM & HAAS COMPANY

THE RESINOUS PRODUCTS DIVISION

Washington Square, Philadelphia 5, Pa.

Representatives in principal foreign countries

MOST IMPORTANT PIGMENT DISCOVERY IN A GENERATION!

Imperial's

MERCADIUM

Now available . . . MERCADIUM* colors . . . a brand new original pigment development. What's more MERCADIUM* colors are not dependent upon restricted or scarce raw materials, and are readily obtainable from their exclusive source—Imperial, the world's largest producer of chemical pigment colors.

- *Non-Bleeding*
- *Heat resistant*
- *Alkali fast*
- *Permanent*
- *Brilliant*

See your Imperial representative for complete details on MERCADIUM* colors and how they may be applied to your production, or write

IMPERIAL PAPER & COLOR CORPORATION

Pigment Color Division

THE WORLD'S LARGEST PRODUCER OF CHEMICAL PIGMENT COLORS

GLENS FALLS, NEW YORK

One of these Imperial Offices and warehouses is probably a neighbor of yours . . . BOSTON • NEW YORK
PHILADELPHIA • PITTSBURGH • CLEVELAND • DETROIT • CINCINNATI • ATLANTA • LOUISVILLE • CHICAGO • ST. LOUIS
HOUSTON • DALLAS • LOS ANGELES • OAKLAND • SAN FRANCISCO • PORTLAND • SEATTLE • TORONTO, CANADA

*Patent applied for
Trademark

all over America it's . . .

PVO for Paint & Varnish Oils

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62 Townsend Street
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1 ATLANTA, GEORGIA
G. R. Nottingham Co.

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R. B. Huber, Sales Engineer

3 CHICAGO, ILLINOIS
Daniel G. Hereley Co.

4 CLEVELAND, OHIO
Donald McKay Smith Company

5 DALLAS, TEXAS
W. W. Richerson Company

6 DETROIT, MICHIGAN
George E. Moser & Son, Inc.

7 HOUSTON, TEXAS
Texas Solvents & Chemicals Co.

8 KANSAS CITY, MISSOURI
Ack Sales Company

9 LOS ANGELES, CALIFORNIA
Pacific Vegetable Oil Corp.

10 LOUISVILLE, KENTUCKY
B. H. Boyet & Company

11 MILWAUKEE, WISCONSIN
J. W. Capps

12 MINNEAPOLIS, MINNESOTA
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13 MONTREAL, CANADA
B. & S. H. Thompson & Company, Ltd.

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15 PHILADELPHIA, PENNSYLVANIA
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16 SAN FRANCISCO, CALIFORNIA
Pacific Vegetable Oil Corp.

17 SEATTLE, WASHINGTON
W. Ronald Benson, Inc.

18 ST. LOUIS, MISSOURI
Ivan T. Bauman Co.

19 TORONTO, CANADA
B. & S. H. Thompson & Company, Ltd.

TRIMETHYLOLPROPANE

another new aldol product from Celanese

1 **In continuous large volume . . .**
2 **With exceptionally high purity . . .**
3 **At a new low cost . . .**

For all producers of polyurethanes and alkyd resins, Celanese expanded production of trimethylolpropane—in the right volume, quality, and at a new low price—is important news.

No longer will it be necessary to pass up the processing and product improvements this polyol can contribute. Now manufacturers can take full advantage of the better adhesion, color, color retention, and hardness it provides in alkyd-based baking enamels . . . the greater mixing ease it offers in compounding polyesters and pre-polymers with diisocyanates.

The way is also clear now for the commercial development of other indicated uses for trimethylolpropane—in the production of synthetic drying oils, plasticizers, surface active agents, polyesters. For working samples and prices write to Celanese Corporation of America, Chemical Division, Dept 558-F, 180 Madison Ave., N. Y. 16.

CELANESE* TRIMETHYLOLPROPANE

Specifications

Hydroxyl value, % by wt., min.	37.5
Water content, % by wt., max.	0.05
Color (10% soln.), APHA, max.	5
Phthalic color, Gardner, max.	1
Acidity, as formic, % by wt., max.	0.002

Q. Why can Celanese produce trimethylolpropane at a price well below that of comparable purity grades?

A. Through the production efficiencies and economies of expanded aldol capacity . . . special Celanese-developed processes . . . and a basic position in aldehydes.

Trimethylopropane is the second in a new series of aldol developments and will be followed by several others—new polyols, glycols and aldehydes. Celanese* 3-Methoxy Butanol, first in the series, is already being produced in large quantities.

Celanese* CHEMICALS

*Reg. U. S. Pat. Off.

Competitive

Bid . . . after bid . . . after bid

Call

Cargill

Incorporated

PRODUCT OF Cargill CREATIVE PROCESSING

Suppliers to the Paint and Varnish Industry

Linseed Oil • Soybean Oil • Fish Oil • Alkyd Resins • Specialty Products

NEWS

High Temp. Resistant Paint Described In Army Report

Development of a ceramic frit, silicone resin type paint capable of withstanding temperatures up to 1400° F. without significant deterioration or loss of protective properties is described in a research report by the Army Corps of Engineers just released to industry through the Office of Technical Services, U. S. Department of Commerce.

The paint was needed by the Army to reduce the accelerated oxidation and rapid destruction of steel components which, under normal conditions of use, are heated to high temperatures in oxidizing atmospheres, such as mufflers and manifolds on automobiles.

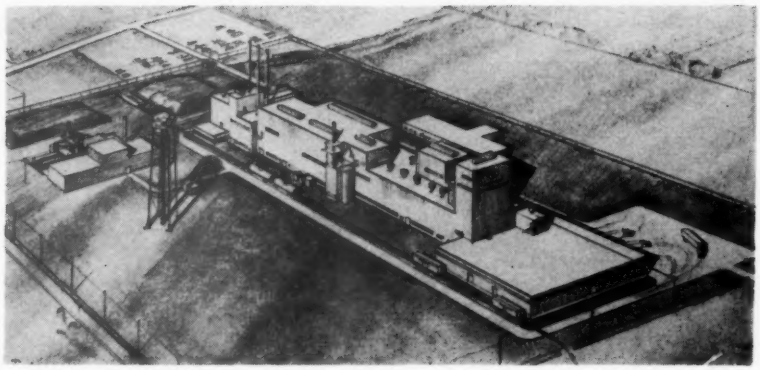
Commercial heat-resistant paints were evaluated and none adequate. Experimental investigations revealed that paints consisting of a blend of ceramic frits, pigments, and refractories at a pigment volume concentration of 35 to 40 per cent, with a frit to pigment and refractory ratio of 3 to 1, were superior to commercial paints pigmented with metallic powders. After development of the paint, a procurement specification was prepared which is included in the report.

This report, PB 111957 *Development of Heat-Resistant Paints*, M. Kornbluth, Corps of Engineers, U. S. Army, may be ordered from OTS, U. S. Department of Commerce, Washington 25, price $4. Dated February 1955, it contains 153 pages.

•

Cyanamid Sells N. J. Plant

American Cyanamid Co. and The New Jersey Zinc Co. have jointly announced that an agreement of sale entered into between them in March 1954, was carried out recently when Cyanamid turned over its Gloucester City, N. J., titanium dioxide pigments plant to New Jersey Zinc. The move followed completion of Cyanamid's new titanium dioxide pigments plant at Savannah, Ga.



FIRST FOR CANADA: Construction of Canada's first titanium pigment plant, pictured in architect's drawing above, at Varennes, Quebec, was begun recently by Canadian Titanium Pigments Ltd., a subsidiary of National Lead Co. The plant is located on a 76-acre tract and will be built at a cost of $15 million. Its entire output of titanium will go to Canadian industry.

GET SURE 3-WAY PROTECTION

... with Nopco anti-foamers for latex paints!

FASTER PRODUCTION!
Cuts excessive foaming during processing!

EASIER PACKAGING!
Gives sure density control, no need to settle paint before packing!

BETTER BRUSHING!
Avoids spotting, fish eyes or bubbles when applying!

And Nopco anti-foamers are truly economical to use also! We have a wide selection of proven anti-foamers . . . for all three major systems of latex paint. So the Nopco technical man can pick out the one best fitted to your specific needs. Why not write for further information today! Nopco Chemical Company, Harrison, N. J.

NOPCO

PLANTS: Harrison, N. J.
Cedartown, Ga. • Richmond, Calif.
London, Ont. Canada

IT'S NEW! IT'S DIFFERENT! It's the paint that beautifies and protects exterior masonry surfaces
IT'S MADE WITH LATEX
The beauty queen of all paints!
A new kind of paint... 8 ways better for exterior masonry surfaces
IT'S MADE WITH LATEX

DOW launches concentrated campaign to boost sales of exterior latex masonry paint

Magazine and newspaper ads! "Minute-Movies"! Dealer promotions! More of the action that zoomed interior latex paints into America's heart—now used to sell exterior latex masonry paint made with STYRENE BUTADIENE.

Here's a sales-making program that means more sales in key markets for manufacturers of exterior masonry paint made with latex (STYRENE BUTADIENE).

CALIFORNIA: Three full-page ads—in full color—appear in *Sunset* Magazine to influence over 1,700,000 readers!

"Minute-Movies" in 39 theaters in the Los Angeles area show advantages of exterior latex masonry paint—these will appear *daily* for four weeks in April and May.

FLORIDA: Ten ads, totaling 6,800 lines, are inserted in the *Miami Herald* during May, June and July. That's over 3-million sales messages!

"Minute-Movies" in Miami, Fort Lauderdale and Palm Beach areas sell the audiences of 14 theaters—every day, every other week, June 1 to August 1.

Special promotions are sent all dealers in these areas.

This campaign blankets two of the sections that buy most of your exterior latex masonry paint. And sells masonry paint made with STYRENE BUTADIENE latex! Tie in with this campaign for bonus sales! THE DOW CHEMICAL COMPANY, Midland, Michigan.

you can depend on

DOW PLASTICS

LATEX T.M.

DOW

NEWS

Hutchins

Baudhuin

Pontiac Varnish, Rockford Paint In Trade Agreement

C. H. Hutchins, president of the Pontiac Varnish Co., Pontiac, Mich., and Ralph J. Baudhuin, president of the Rockford Paint Mfg. Co., Rockford, Ill., have jointly announced that the two companies have entered into an agreement whereby they will accomplish substantial economies in research, manufacturing and distribution.

Under this arrangement, which took effect Apr. 16, Rockford Paint will acquire and maintain all of Pontiac's retail stores and trade-sales organization, which will continue to serve dealer and distribution outlets; manufacture and distribution of Pontiac's house paints, enamels and varnishes under their original formulations, brand names and labels will be moved to the Rockford plant. The Illinois company will also distribute its own line of "Rockcote" paints, enamels, and varnishes, as well as its "Signature" tinting system and other products. Pontiac Varnish Company will concentrate its entire effort in the expanding technology of industrial product coatings and will take over certain areas of distribution in the industrial product markets now being served by Rockford Paint Manufacturing Company. The arrangement will release certain of Pontiac's facilities for increased production of industrial product coatings and for further expansion of research and customer service laboratories. Pontiac's trade sales will have the advantage of the specialized research and marketing experience of Rockford's staff.

George Bowden, former trade director of Pontiac has been appointed director of the Michigan Division of Rockford.

•

Pentaerythritol, Tall Oil

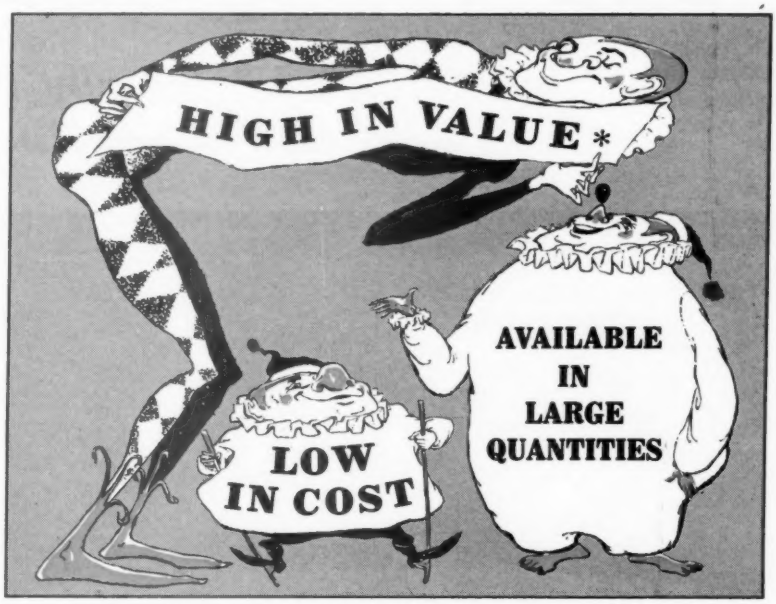
An informal "Symposium on the Use of Pentaerythritol and Tall Oil" was sponsored last month by Delaware Chemicals, Inc., Staten Island, N. Y. The symposium, third in a series which is sponsored from time to time as a service to the protective coatings industry, was held at the Chemists' Club in New York City.

The panel was composed of Dr. Wouter Bosch, chairman, paint department, North Dakota State College; George H. Eick, technical service manager, Arizona Chemical Co.; Paul D. Patrick, technical sales department of industrial sales division, West Virginia Pulp & Paper Co., and Dr. Norman Weiderhorn, research and development division, Arthur D. Little, Inc. Moderator was Fred Byerly, sales manager, Delaware Chemicals, Inc.

•

Naftone Appoints Agent

Naftone, inc. has appointed Harry A. Baumstark & Co. as sales agents in St. Louis and southern Illinois. The new agents will handle the sale of "Oronite" naphthenate driers and other raw materials marketed for the paint and allied industries, according to C. A. Klebsattel, Naftone vice president.



PICCOPALE

The extremely low cost of PICCOPALE, and its availability in enormous quantities make this new type of petroleum resin ideal for use as a basic raw material. It is chemically inert—not affected by acids, and alkalies; moisture-proof; compatible; soluble in naphthas, chlorinated and other solvents. Available in liquid solution or in flaked or solid form.

★ 100% petroleum polymer
★ Versatile, compatible, permanent
★ By the trainload, if you wish

WRITE for complete data, specifications and samples.

Pennsylvania Industrial Chemical Corp.
Clairton, Pennsylvania
Plants at:
Clairton, Pa., West Elizabeth, Pa., and Chester Pa.
District Sales Offices
Boston, New York, Detroit, Chicago, Cincinnati
Los Angeles, Philadelphia, Pittsburgh

PENNSYLVANIA INDUSTRIAL CHEMICAL CORP. PVP
Clairton, Penna.
Please send me a copy of your bulletin describing PICCOPALE and samples of grade for (application)
Name _____ Position _____
Company _____
Address _____

STANDARDIZE ON MONSANTO

NOW...
Dibutyl Maleate and Dibutyl Fumarate

Available for *internally plasticized polyvinyl acetate emulsion paints!*

Although these quick-drying internally plasticized flats have big consumer appeal—as primer-sealers for tract building, they allow finish painting to start one hour after priming.

FOR PROFITS IN PAINT

These new monomers for polyvinyl acetate copolymer emulsions are ready for you by the tank car, tank truck, or drum—at attractive low cost to you.

With dibutyl maleate or fumarate in the range of 15-25 parts per hundred of resin, you can permanently plasticize polyvinyl acetate by copolymerization. One of the advantages of the internal plasticizing: You gain more lasting control over the film's flexibility.

These internally plasticized emulsions are ready to go to work for you *now*. Investigate these improved properties that have been reported with polyvinyl acetate copolymer emulsions containing Monsanto dibutyl maleate and fumarate—

Better pigment binding
Low-temperature film-forming
Improved migration resistance
Retention of flexibility
Better scrub resistance
Better weather resistance
Quick dry

If you start with vinyl acetate monomer—request Monsanto to send you laboratory-size samples of dibutyl maleate and fumarate for evaluation as plasticizing co-monomers in your emulsion polymerization.

If you are thinking of adding polyvinyl acetate paints to your line—write Monsanto for sources of ready-to-use internally plasticized emulsions.

If you make polyvinyl acetate paints for plaster, concrete, stucco—now is the time to evaluate the internally plasticized system.

Contact your Monsanto salesman, or write Organic Chemicals Division, MONSANTO CHEMICAL COMPANY, Dept. PT-3, 800 N. 12th Blvd., St. Louis 1, Mo.

Internally plasticized systems have maximum permeability. By "breathing," they control blistering and film lifting.

The internally plasticized systems offer maximum scrub resistance, apparently due to better polymer formation.

MONSANTO

Where Creative Chemistry Works Wonders for You

TALL OIL unitol NEWS

TALL OIL · UNION BAG PRODUCTS

Union Bag & Paper Corporation • Chemical Sales • 233 Broadway, New York 7, N. Y.

SWEDISH NAME NOW, BUT IT WAS ONCE "FINN OIL"

An oil obtained from the pine wood used in making kraft paper, tall oil gets its name from the Swedish "tall" for pine. The material originally was investigated in Sweden, where it is now known as "tallolja", or "oil of the pine tree."

Earlier tall oil designations in this country, many of them presently obsolete, are listed by the American Society for Testing Materials:

Crude resinous liquid	Sulphate rosin
Finn oil	Swedish pine oil
Lignin liquor	Swedish resin
Liquid resin	Swedish rosin
Liquid rosin	Swedish resin oil
Pine wood pitch	Swedish rosin oil
Resin oil	Sylvic oil
Sulphate pitch	Talloel
Sulphate resin	Tallol

CURRENT TALL OIL DATA AVAILABLE

Two useful publications are now available without charge to paint industry executives and technical men.

A revised edition of "Facts and Formulas for Coatings," one of the most requested brochures in Union's history, includes current data on Unitol G-7 formulations. The thirty page brochure provides authoritative data on the use of Unitol in typical formulations required by the coating industry.

"Handling and Storage," a recently published booklet, is a concise and practical guide covering handling procedures, storage and safety precautions for Unitol in drum and tank car shipments.

For copies of either or both publications, write Chemical Sales, Union Bag & Paper Corporation, Woolworth Building, 233 Broadway, New York 7, N. Y.

Union Becomes First to Produce and Sell Full Tall Oil Line

With the completion of its new tall oil fractional distillation plant at Savannah, Ga., Union Bag has become the only manufacturer equipped to produce and sell all the basic tall oil products. These include crude, acid-refined and distilled tall oils; tall oil fatty acids; tall oil rosins and tall oil pitch.

The new Union distillation plant is one of the important elements in an industry-wide expansion program which has seen production of crude (whole) tall oil increased 50 per cent in 1955. New distillation facilities in operation by the end of 1956 are expected alone to require the total production of crude tall oil in 1955.

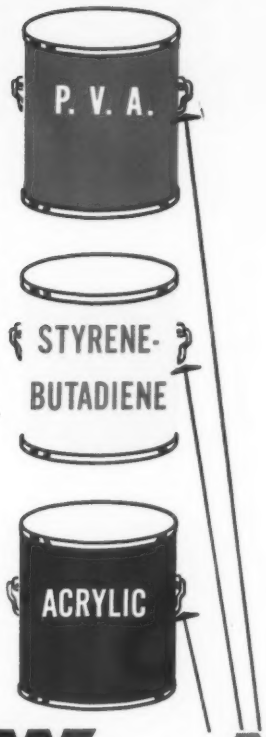
The increasing use of better grades of tall oil in the protective coatings field is only one manifestation of a growing interest in this relatively new industrial oil. Tall oil is now also used in important measure in the manufacture of soaps and cleansers, linoleum, clothes, adhesives, disinfectants, fungicides, asphalt emulsions, paper sizes, and waterproofing agents.

While it is estimated that the total 1956 theoretical production of tall oil will be in the range of 350,000 tons, the growing demand for some grades indicates that they may temporarily be in short supply. Union Bag officials indicate, however, that the company's entire output of Unitol products will be on the free market, with none reserved for captive use.

Tall Oil 40% Better Buy Than in January, 1955

Tall oil's relative stability of price again is strikingly demonstrated by a comparison with fluctuations in vegetable oil prices. As a consequence of a series of increases in charges for vegetable oils, tall oil is now, dollar for dollar, a 40 per cent better buy than it was eighteen months ago.

The fractionating column of the new Union tall oil distillation plant will have a processing capacity of over 1,000 tons of crude tall oil monthly. Storage tanks to the left are for storage of product during various stages of refinement. Water cooling tower at extreme right is made of rot-resisting California heart redwood.



now... A Complete Line of *Stir-in* colors

FOR EXTERIOR AND INTERIOR EMULSION PAINTS

Including chemical pigments, selected oxides, blacks and earth colors

These Aqueous Color Dispersions

Give you

WIDE COMPATIBILITY

All colors efficient in emulsions from PH 4.5 to 9.5

SUPERIOR MONEY VALUE

Improved tinting strength with easy mixing reduces labor and material costs.

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All colors pre-checked for compatibility in specific paints.

Our Technical Service Lab is at your service for the solution of matching problems. Check your requirements on coupon below and mail to us for immediate attention.

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AND CHEMICAL COMPANY, INC.
LOUISVILLE 12, KENTUCKY

_____ **Mail Data Sheet and Price List**
_____ **Send Sales Representative**

NAME_____

FIRM NAME_____

STREET NUMBER_____

CITY_____ STATE_____

HERE'S A NEW FILM ABOUT PE QUALITY

Pentaerythritol gets star billing in "The Little Steps"—a new 15-minute, sound and color motion picture recently released by Hercules Powder Company.

Basically, this film tells the story of chemical progress—the story behind Hercules' improved Technical PE and new Mono-PE. It shows how, through a constant program of basic research and process improvement, a typical chemical material becomes constantly better and more useful to resin and coatings manufacturers.

We're sure you'll find this behind-the-scenes glimpse of chemical research in action both interesting and profitable. If you want to schedule a showing either for your own company or for club or school use, contact your nearest Synthetics Department branch office, or write:

Synthetics Department
HERCULES POWDER COMPANY
INCORPORATED
926 Market St., Wilmington 99, Del.

SP56-5

PERSONNEL CHANGES

J. J. Reed

M. S. Rhodes

NATIONAL ANILINE

John J. Reed has been named product manager, isocyanates, and **M. S. Rhodes** has been named product manager, resin chemicals, according to an announcement by H. J. Daigneault, vice president.

Mr. Rhodes joined the company as a chemical intermediates salesman in 1953.

Mr. Reed has been associated with National Aniline as nylon plastics coordinator since 1954.

Ross M. Sims has been appointed plant manager in charge of all operations of the Moundsville, W. Va. plant, according to an announcement by M. A. Conner, vice president. Mr. Sims has been plant superintendent since May, 1953.

PICCO

James K. Stevenson has been named district manager of the newly established New England district office in Boston. Mr. Stevenson joined joined the company in 1952 after service with Battelle Memorial Institute as a research engineer in the rubber and plastics division. He also previously had been associated with Monsanto Chemical Co. Mr. Stevenson is a graduate of Ohio State University, where he was a research assistant on API pure hydrocarbons program.

J. K. Stevenson

KRYLON

Robert O. Dickey Co., 8101 Lee Boulevard, Kansas City, Mo., has been appointed representative to cover the automotive, hardware and paint fields in Kansas, Nebraska and Iowa, it was announced by James W. Bampton, Krylon president. The Dickey Co. replaces Fred O. Somers & Co.

ARMOUR and COMPANY

Robert H. Warner and **William J. Ward** have been appointed sales representatives by the chemical division, J. M. Hoerner, division general manager, announced.

Mr. Warner's territory covers Wisconsin, eastern portions of Iowa and Minnesota, and the north side of Chicago.

Mr. Ward will cover northern New Jersey and parts of New York and Pennsylvania.

GLYCO PRODUCTS

Samuel Cohen has been appointed sales-manager.

Mr. Cohen received his B.S. degree from the College of the City of New York and his Master's degree in chemistry from New York University. He spent twelve years in the research laboratory in the plant and sales department of the company.

J. K. Ames

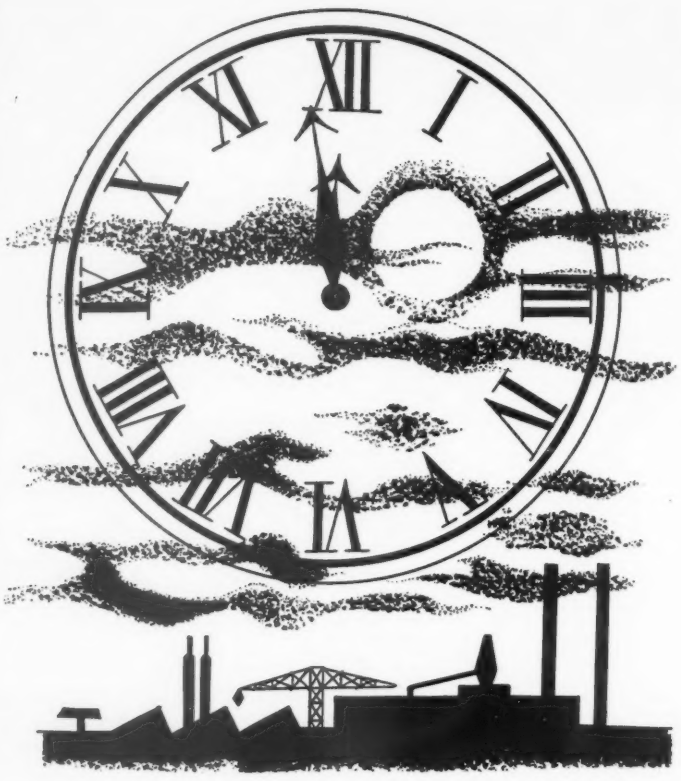
D. M. Stettler

COLTON CHEMICAL

Bernard R. Krashin, president, has announced the expansion of sales and service territory under Chicago District Manager **James K. Ames** to include Minneapolis, St. Paul, Kansas City, St. Louis and Wichita. It was also announced that **David M. Stettler** will assist Mr. Ames in sales and technical service.

DEADLINE—MIDNIGHT

How Quick Service Paid Off For One Of The Nation's Leading Vitamin Producers



Fast action was called for. Through an oversight, one of America's leading pharmaceutical manufacturers was in trouble. His supply of extraction solvents—vital in vitamin processing was almost gone. 2000 gallons of solvents were needed by Saturday midnight. Otherwise, the production line would shut down, spoilage would result, men would be laid off, production schedules would be disrupted.

The time was Saturday afternoon.

The P. A. called the salesman. He'd gone fishing. But his home contacted the sales manager. The sales manager called the plant manager. "Meet me at the plant," he said. Together, they called a transport driver. Personally, they filled the transport and the order was delivered before dinner.

Out of ordinary service? Of course—but it's the kind you get from your nearby Solvents and Chemicals Bulk Plant. Prove it to yourself. Call today for information, prices and samples.

products of the SOLVENTS and CHEMICALS GROUP

Aliphatic Petroleum Naphthas
Alcohols and Acetates
Alkanolamines
Aromatic Solvents
Petroleum and Coal Tar
Chlorinated Paraffins
Chlorinated Solvents
Dowanols and Glycerine
Glycols and Glycol Ethers
Ketones and Ethers
Oils and Fatty Acids
Plasticizers
Resinates Sodium and Potassium
Rosins Gum and Wood
Stearates
Terpene Solvents
Waxes

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4619 Reading Road—Elmhurst 1-4700
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Box 73, Station B—Bedford 1572
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CENTRAL SOLVENTS & CHEMICALS CO.
2540 West Flournoy Street—SEeley 3-0505
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HOOSIER SOLVENTS & CHEMICALS CORP.
1650 Loett Ave.—MElrose 8-1361
Indianapolis 22, Ind.
Nelson Road East—Anthony 0213
Fort Wayne 8, Ind.

MISSOURI SOLVENTS & CHEMICALS CO.
419 De Soto Ave.—GArfield 1-3495
St. Louis 7, Missouri
2522 Nicholson Ave.—CHestnut 1-3223
Kansas City 20, Missouri

OHIO SOLVENTS & CHEMICALS CO.
3470 W. 140th St.—CLearwater 2-1100
Cleveland 11, Ohio

SOUTHERN SOLVENTS & CHEMICALS CORP.
917 Jefferson Highway, P.O. Box 4067
Carrollton Station—VErnon 3-4666
New Orleans 18, Louisiana

TEXAS SOLVENTS & CHEMICALS CO.
8501 Market Street—ORchard 2-6683
Houston 15, Texas
2500 Vinson Street—Federal 5428
Dallas 12, Texas

WESTERN SOLVENTS & CHEMICALS CO.
6472 Selkirk Ave.—WAlnut 1-6350
Detroit 11, Mich.
Central Ave. at Reynolds Road—Jordan 0761
Toledo 8, Ohio

WESTERN SOLVENTS & CHEMICALS CO.
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1454 Crawford St.—CLearwater 2-0933
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Milwaukee 14, Wisconsin

WOLVERINE SOLVENTS & CHEMICALS CO.
1500 Century Ave., S.W.—CHerry 5-9111
Grand Rapids 9, Michigan

THE SOLVENTS AND CHEMICALS GROUP
2540 West Flournoy Street • Chicago 12, Illinois

W. G. Engler

A. H. Hallenbeck

GIFFORD-WOOD

Walter G. Engler and **Alfred H. Hallenbeck** have been appointed vice presidents of the company.

Mr. Engler, who joined the firm in 1929, has been general sales manager since 1951. Prior to this, he was manager of the New York office from 1947 to 1951, and manager of the Chicago office from 1941 to 1947. He has been instrumental in the development of many of the company's automatic conveying systems.

Mr. Hallenbeck was works manager of the company's Hudson plant before his new appointment. He started with the firm 35 years ago in the engineering department, and to his credit go the many improvements in the company's manufacture of products.

CELANESE

Howard Jerome has been appointed midwest technical sales representative for polyvinyl acetate emulsions and will work out of the plastics division's sales office in Chicago.

Howard Jerome

A graduate of Northwestern University, with a B.S. in chemistry, Mr. Jerome was formerly associated with the E. F. King Co. and the Moderne Paint Co., of Chelsea, Mass. He is a former vice president of the New England Paint and Varnish Production Club.

UNIVERSAL PAINT

Rollo J. Kidd has been appointed to the technical staff. He has been a paint chemist since 1927, serving with Cleveland Varnish Co., John Lucas Paint Co., and The Sherwin-Williams Co. until 1941. From 1941 to 1946 he was technical director of Midland Industries of Waukegan, Ill.

From 1946 until the present, Mr. Kidd has operated as a consultant to many paint and allied industrial firms. He will now concentrate chiefly on new products and on further development of "Uni-Mulsion," the company's water-thinned line of industrial product finishes.

MAUTZ PAINT and VARNISH

William Hallman, plant manager, has been elected vice president in charge of manufacturing, it was announced by Bernhard Mautz, president.

Mr. Hallman joined the organization four years ago as plant manager. Prior to that, he was engaged in the technical and production end of the paint business for more than 20 years. He is presently assisting in the planning of a proposed new paint factory.

COLUMBIAN CARBON

Joseph E. Dierkes has joined the colloidal dispersions unit and is now in charge of control and production at the company's new Tacony, Pa. plant. A graduate of Yale University, Mr. Dierkes comes to the company after three years at Acheson Dispersed Pigments Co.

SPENCER KELLOGG

Dr. Alfred S. Cummin has been appointed manager of industrial products research at the new Research Center in Buffalo, N. Y. According to Dr. Malcolm M. Renfrew, research director, Dr. Cummin will be responsible for the early development of new products and processes, with emphasis in the coatings field, and for the fundamental research program involving vegetable oils and proteins.

A. S. Cummin

Formerly, Dr. Cummin was supervisor, dielectrics advanced development with the General Electric Co. in Hudson Falls, N. Y.

Do you recall YELLOW OCHRE?

THE SCENE: *southern France.* The year: *1890.* These men laboriously wheeled casks of REICHARD-COULSTON yellow ochre into a freight car for shipment to America.

Even in those days, forward-looking paint formulators knew they could count on the quality of REICHARD-COULSTON ochres and other products.

... That is how it was done three quarters of a century ago. Since then, many changes have taken place in the paint industry. One of these is the development of chemically produced REICHARD-COULSTON IROX Yellows for use in the modern formulae of today – replacing the hard grinding, tinctorially weak ochres.

REICHARD-COULSTON IROX Yellows are popular because of their rich top tones and clean, chromy tints, fine particle size, extra low water soluble salts content and ease of dispersion.

What is true of REICHARD-COULSTON IROX Yellows applies equally to other REICHARD-COULSTON products such as IROX and SOFTEX reds, ERCO RECO and Chestnut Browns and the whole range of REICHARD-COULSTON pigments.

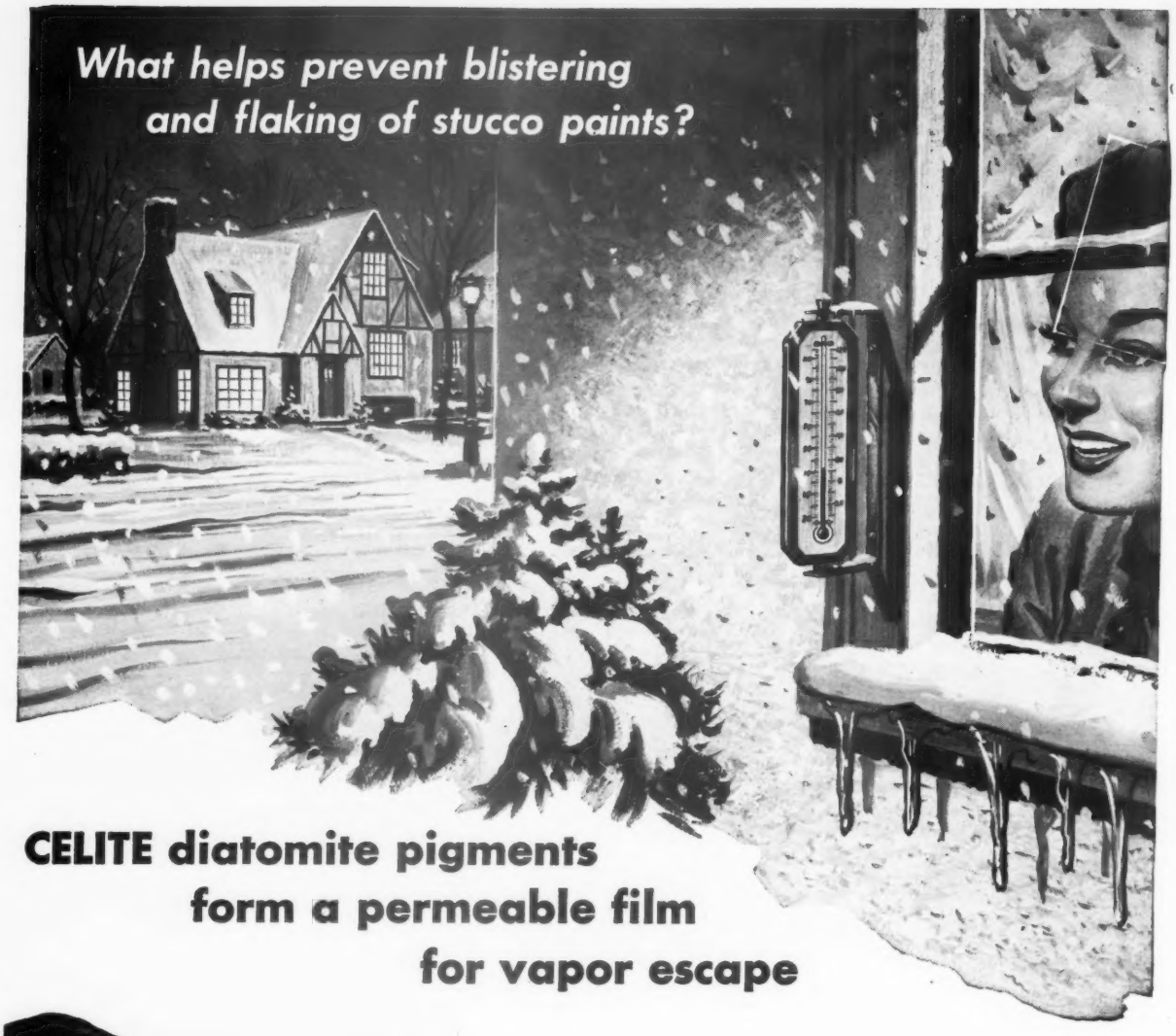
Chances are that REICHARD-COULSTON pigments can help *your* production. Look into it. For free laboratory samples and technical data, write today.

Natural IRON OXIDE PIGMENTS *Synthetic*

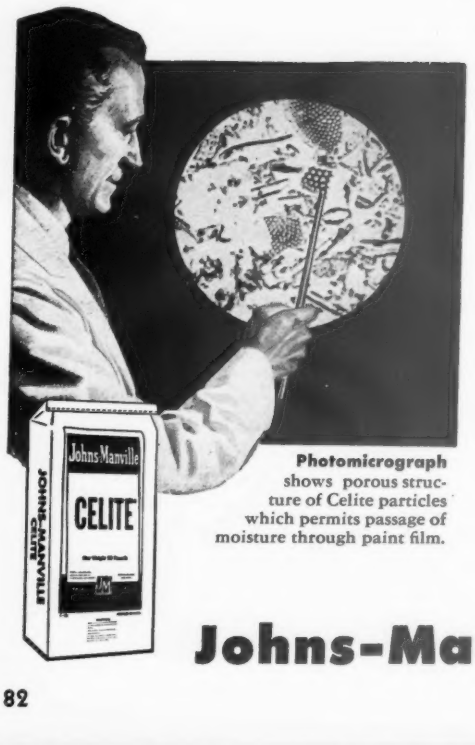
Reichard-Coulston, Inc.

15 EAST 26th STREET, NEW YORK 10, N. Y.

Warehouses in principal cities. Factory: Bethlehem, Pa. Over a century of manufacturing and service.



CELITE diatomite pigments form a permeable film for vapor escape



Photomicrograph shows porous structure of Celite particles which permits passage of moisture through paint film.

COLD WEATHER spells trouble for stucco paint. For the colder it gets the greater the vapor pressure due to the temperature differential. When paint resists this pressure, serious blistering and flaking result. But when Celite* is present in the formulation, the moisture passes through a vapor-permeable film formed by the microscopic particles. Yet this same film will resist the penetration of exterior moisture.

Celite helps paint withstand the assaults of severe weather on the outside, too. Its hard, tough, silica composition provides extra strength and durability. And the flexible interlacing structure of the particles readily permits the film to expand and contract with temperature changes.

Celite also helps when the paint is applied. Its porosity shortens drying time and its superior dry hiding power provides excellent coverage . . . frequently at the saving of prime pigment. Find out more about these extender pigments. Write today to Johns-Manville, Box 60, New York 16, N. Y. In Canada, Port Credit, Ontario.

JOHNS-MANVILLE JM PRODUCTS

*Celite is Johns-Manville's registered trade mark for its diatomaceous silica products

Johns-Manville CELITE THE EXTENDER PIGMENTS FOR ALL COATINGS

E. S. Wormser

A. L. Shirley

GIBSON-HOMANS

Norman M. Cornell, president, has announced the following new appointments:

Eric S. Wormser is the company's new director of research. Mr. Wormser is chairman of the Roof Coating Technical Advisory Subcommittee of the National Paint, Varnish & Lacquer Association and an active member of the Educational Committee, Federation of Paint and Varnish Production Clubs. He is a past president of the Kansas City Paint and Varnish Production Club.

Arthur L. Shirley, Jr., a member of the sales department since 1954, has been named assistant sales manager. In his new capacity he will work closely with the industrial sales and wholesale sales departments.

REICHHOLD CHEMICALS

F. Albert Smiles, director of technical service, has been named general manager of the firm's Elizabeth, N. J., plant.

F. Albert Smiles

In his new post Mr. Smiles will assume duties performed, until recently, by **Dr. S. H. Baum** who was elected executive vice president.

In addition to his job as operating head of the Elizabeth plant Mr. Smiles will be in charge of technical service for customers in the metropolitan New York area and upper New York State, New England, Pittsburgh, Philadelphia, Baltimore, Washington, D. C., and Virginia.

Dr. C. A. Knauss has been appointed vice president in charge of coating resins. Until recently he has been vice president in charge of eastern sales service, a regional post. The scope of his new duties will be national.

TAMMS INDUSTRIES

Loren T. Rice has been appointed sales representative for the state of Iowa. He will service the company's diversified line of raw materials in the paint, abrasives, feed mineral and chemical fields.

LIQUID CARBONIC

H. C. Mathey has been promoted to vice president in charge of sales. He is a graduate of Lafayette College, has been with the company for thirty years. During that time he has had very wide experience in the compressed gas divisions.

Prior to assuming his new duties, Mr. Mathey was vice president in charge of the Pacific Coast operations.

INSTRUMENT DEVELOPMENT

Donald R. Hall has been appointed sales engineer for Instrument Development Laboratories, Massachusetts manufacturers of the color-eye colorphotometer and electromechanical components for the military services. He will act as sales engineer of the paint, plastics and allied industries.

DOW CHEMICAL

Edward J. Walsh has been appointed eastern field representative in charge of technical assistance to the latex paint industry, it was announced by the plastics department.

E. J. Walsh

Mr. Walsh, who has been a staff member of the company's coatings technical service since 1953, will make his headquarters in the New York sales office. A native of Jamestown, N. D., he holds a B.S. degree in chemistry and an M.S. in organic chemistry from North Dakota State College. Since joining Dow in 1953 his work has been in the field of latexes.

Our Technical Service Laboratory Will Help You Build Better Products With Neville Resins

If you are not already using Neville coumarone-indene or petroleum resins in your paint or varnish formulae, it will pay you to request the assistance of our Technical Service Laboratory. Our chemists will work with yours to establish the exact grade to best suit your purpose. Neville resins are inert, add resistance to acids, alkalis, brine and water and may be cold-blended or cooked with all commonly used drying oils. Use the coupon to write for details.

Resins—Coumarone-Indene, Heat Reactive, Phenol Modified Coumarone-Indene, Petroleum, Alkylated Phenol • Oils—Shingle Stain, Neutral, Plasticizing, Rubber Reclaiming • Solvents—2-58 W Hi-Flash, Wire Enamel Thinners.

Neville Chemical Company
Pittsburgh 25, Pa.

NEVILLE

Please send information on Neville Chemicals.

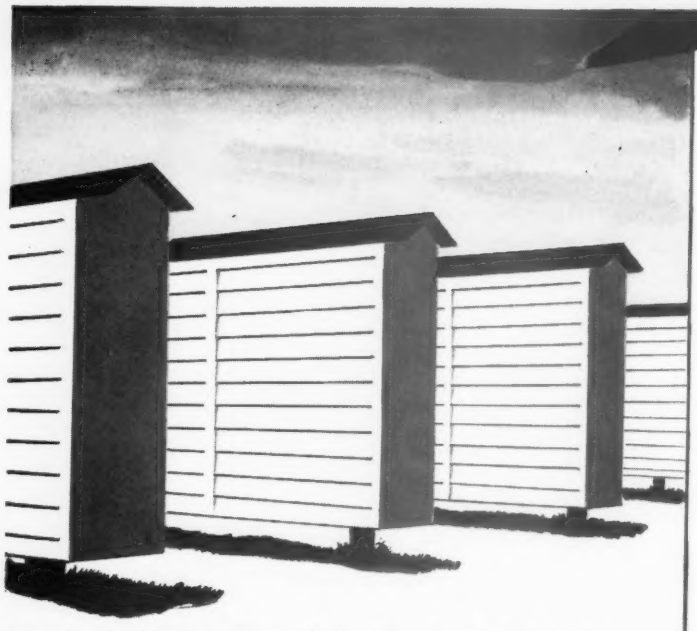
NAME TITLE

COMPANY

ADDRESS

CITY STATE

PVP-6



Every day for 36 years the records have been taken at National Lead's Experimental Test Station, Sayville, L. I. . . . the weather, hour by hour . . . solar radiation . . . the chemistry of the air . . . the condition of thousands on thousands of paint samples. Today, on 2½ miles of test fence, more than 30,000 exposure tests are active.

FOOLPROOF

your exterior paints with Dutch Boy®

"45X"

(Basic Silicate White Lead)

How can you give exterior paints uniform performance?

For years leading paint makers have said, "Use lead." Today they specify Dutch Boy Basic Silicate White Lead "45X". And at National Lead's Sayville Experimental Test Station, anyone can see why.

Here, for all to see, are exposure panels that give proof "45X" is lead in its most efficient and economical form.

Proof that "45X" improves self-cleaning, yet preserves film integrity of *white* House Paints.

Proof that "45X" increases film durability and maintains color uniformity of *tinted* House Paints.

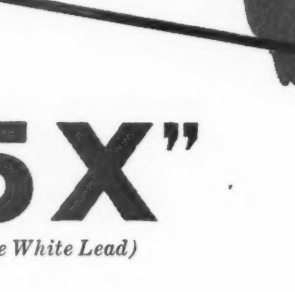
Proof that "45X" strengthens adhesion in Primers.

In paint after paint, Dutch Boy "45X" steps up key properties underlying *uniform* performance . . . stops complaints *before* they start.

Cost actually goes down

In "45X" proportionately larger amounts of lead are available. That's because the reactive portion of each pigment particle is concentrated at the surface.

Fewer complaints, fewer pounds of lead! That's why it's profitable to make your exterior paints with Dutch Boy Basic Silicate White Lead "45X".



NATIONAL LEAD COMPANY, 111 Broadway, New York 6, N. Y.
In Canada: **CANADIAN TITANIUM PIGMENTS LIMITED,** 630 Dorchester Street, West · Montreal

E. A. Olson

R. G. Brierley

J. H. Daniels

D. A. Copenhaver

A-D-M

Thomas L. Daniels, president, has announced the appointment of **Erwin A. Olson** as administrative vice president, the election of **Richard G. Brierley** as vice president, and a change in the responsibilities of **John H. Daniels** and **Daniel A. Copenhaver.**

Mr. Olson, a vice president, was named to fill the newly created position of administrative vice president and will direct many of the company's staff functions.

Mr. Brierley, newly elected vice president, succeeds Olson as manager of the company's W. J. Small Division. He was previously an assistant vice president and has been in charge of production and procurement for this division since 1952.

Mr. Daniels, assistant vice president and sales manager for linseed oil sales, will move to Kansas City, Mo. to succeed Brierley.

Mr. Copenhaver, in charge of the company's marine oil sales since 1953, will also head up linseed oil sales.

James W. Moore, vice president and general sales manager has announced the following:

Calvin L. Immel has been appointed technical sales representative in the Philadelphia area.

Richard V. Grogan has returned to the Los Angeles sales office after attending for the past eleven weeks an intensive "product familiarization" sales training course conducted at the company's research laboratory.

Charles A. Aldag has been appointed technical sales representative in the Cincinnati area.

Stanley Shepard has been appointed specialty oils technical sales representative for the company.

JOHN H. CALO

Patrick V. Lepore has joined the sales staff. Experienced in resins, pigments and oils for the coatings, printing ink and adhesive industries, he will serve the metropolitan New York area.

Mr. Lepore has been employed, since graduating from Seton Hall University in 1949, by American Cyanamid Co. and Krumbhaar Chemical Co. as chemist and sales representative.

WICA CHEMICALS

William B. Amos has joined the company as sales technician, it was announced by William C. Caldwell, president.

Mr. Amos's association is in anticipation of Wica's establishment of plant and warehouse facilities to serve the areas of Georgia, Alabama, and Tennessee. He has had extensive experience in textile dyeing and finishing.

GEORGIA MARBLE

William B. Tate, Jr., was elected vice president of the company, it was announced after a recent meeting held by the board of directors. Except for a short period of time, Mr. Tate has been sales manager of the calcium products division of the company since it was begun in 1947.

W. B. Tate

J. W. VAN TUIN

David S. McConnell has been named sales representative for the J. W. Van Tuin Co., Chicago, sales agency for California Ink Co., Inc. and Nuodex Products Co.

The "Pony" Paste Mixer comes in 2 convenient types:

TYPE 1—With portable turntable *(shown).* Tilt the mixing head out of the batch; the turntable becomes a dolly on which to transport the can.

TYPE 2—With attached turntable. The can is removed at the machine.

Both types are available with a single mixing speed of 45 RPM or a variable speed of 30-90 RPM. Choose from 60 or 80 gallon working capacities.

NOW! A Change Can Mixer with the Performance Advantages of a Heavy Duty Paste Mixer!

Unique mixing action! There you have the "secret" of the "Pony" Paste Mixer. This machine combines the mixing advantages of the sigma blade, or heavy duty, paste mixer with the versatility and ease of cleaning of a change can mixer. Here is how it works:

The "Pony" Mixer's 2 sets of U-shaped blades approach its two stationary breaker bars at a constantly diminishing angle, compressing the materials caught between. This creates intense shear and excellent wetting.

The staggered position of the blades permits these intense actions to be in rapid series. This reduces the load on the machine and permits the handling of heavy pastes with comparatively little power requirements.

The wide tapered bottom blades impart an upward thrust and roiling action to the material. The can rotates in the same direction as the mixing blades at an unsynchronized rate of speed. The entire batch is constantly agitated, constantly moving; "dead" spots and stratification of materials are eliminated. This, plus the intense shear developed, guarantees superior wetting, a homogeneous batch and reduces the load in the final grinding process.

Find out how the "Pony" Mixer can help *you.* For a free, illustrated folder, fill in and mail the coupon *today!*

Close-up of the "Pony" Paste Mixer's 2 sets of U-shaped polished steel blades. These heavy blades revolve around 2 stationary, polished steel breaker blades. Compression and shear developed is intense. Wetting action is excellent. Stirring action is continuous. "Dead" spots and stratification are completely eliminated.

Herman Hockmeyer and Company **PVP-66**
341 Coster St., New York 59, N. Y.

GENTLEMEN: Please send me your free, illustrated folder describing the "Pony" Paste Mixer in complete detail.

My name is .....

Company .....

Address .....

City ..... *Zone* ... *State* .....

HERMAN HOCKMEYER & CO.
341 COSTER ST., NEW YORK 59, N. Y.

DIAMOND ALKALI

Loren P. Scoville, general manager of the chlorinated products division, has announced three new staff appointments:

Dr. M. J. Skeeters, acting manager of research since June 1955, becomes manager of research with responsibility for the division's research, development, and sales technical service program.

Alex Hlynsky has been named divisional group leader for research, the post in which he has been serving since last June. He will continue to be concerned primarily with research on organic chlorinated compounds.

Robert J. Orlik, a member of the divisional administrative staff since May 1955, takes over the assignment of sales promotion representative for agricultural chemicals. He will coordinate various sales activities at the home office with those of its branch sales offices.

Both Dr. Skeeters and Mr. Hlynsky will continue to be located at the Painesville (Ohio) Works, while Mr. Orlik will make his headquarters at Cleveland.

BARRETT DIVISION

Dr. Sidney Pearson has joined the staff of the Shadyside Research Laboratory of the Barrett Division, in Edgewater, N. J. He will investigate synthesis of new monomers and fine chemicals.

Dr. Pearson received his B. S. degree from City College of New York, his M. S. in organic chemistry from Brooklyn Polytechnic Institute and his Ph. D. from Ohio State University.

EAGLE-PICHER

John T. Clark, sales representative for the chemical division in the Cincinnati area, has been transferred to the company's offices in Joplin, Mo. to head the paint research and sales service activities.

J. T. Clark

A chemical engineering graduate of the University of Florida, Mr. Clark also completed postgraduate study at Carnegie Institute of Technology, Pittsburgh. He joined the company in 1923.

John E. Gulick, of the New York sales offices, is being transferred to Cincinnati to succeed Mr. Clark.

HERCULES

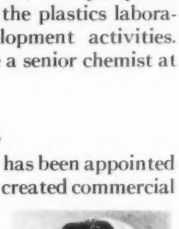
Joseph J. Coughlan and **Benjamin F. Brown** have been appointed to the technical sales staff of the plastic sales division, it was announced by Werner C. Brown, director of sales for the cellulose products department.

Mr. Coughlan is returning to the cellulose products department after five years with Standard Insulation Co., as assistant sales manager and sales manager. He first joined Hercules in 1942. He will be stationed, for the next three months, in the plastics laboratory of the Parlin, N. J., plant on an orientation program.

Mr. Brown joined the company in 1950 and was first employed in the physics division at the experiment station. In 1953 he was transferred to the company's Parlin, N. J., plant, where he worked in the plastics laboratory on sales development activities. In 1955 he was made a senior chemist at Parlin.

INTERCHEMICAL

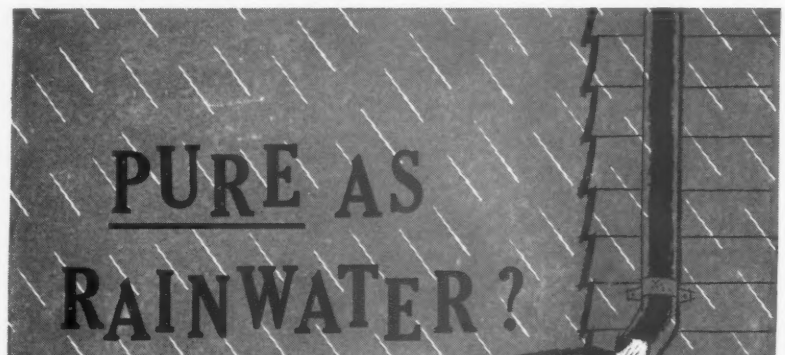
Francis H. Bebee has been appointed manager of the newly created commercial development department.



F. H. Bebee

The responsibilities of the new department include investigation of the commercial possibilities of new products and new fields of activity, as well as the commercialization of projects and new products to the point where they are assigned to an operating division.

Mr. Beebe is an engineering graduate of the University of Michigan and a law graduate of New York University. He joined the company in 1937, his most recent position being assistant to the division president, textile colors division.



In olden days before smog was invented, perhaps rain actually was pure enough to merit this saying. But today "pure as a Metasap Stearate" would far more accurately describe perfect purity—completely guarded against contamination... to help you protect the quality and sure performance of your fine paints!

For the entire Metasap plant and all operating procedures are aimed at only one thing—to guarantee that Metasap Stearates shall be not only clean... *but cleaner than any other stearates you can buy!* Metasap uses the most complete and thorough series of fine screens, magnetic traps and filters to be found in the entire industry. (We even carefully filter the air).

So when you require stearates and other chemicals of supreme purity, uniformity and fine quality—come to Metasap for *all* your needs! Our technical service men are always gladly at your service!

METASAP CHEMICAL COMPANY
HARRISON, NEW JERSEY • Chicago, Ill. • Boston, Mass.
Cedartown, Ga. • Richmond, Calif. • London, Canada
A NOPCO Subsidiary
the cleanest stearates made

Don't let your paints get in scrapes like this!

Use ADMEROL 75-M for Stain and Blister Resistant Finishes

● Do you want to formulate proved stain and blister resistance into your paints? You can with America's fastest selling vehicle for stain and blister resistant paints . . . Admerol 75-M.

Paints that will provide early protection against stain and blistering need a fast drying vehicle with the excellent durability of Admerol 75-M.

Admerol 75-M is fortified through copolymerization so it requires no additional fortification with zinc and lead pigments. Thanks to its fast dry and cure, paints made with Admerol 75-M are free from dirt collection and have excellent mildew, water, and alkali resistance.

Pigmented with titanium dioxide and magnesium silicate at approximately 31% PVC, it provides the ultimate in stain and blister resistance.

Evaluate Admerol 75-M in your laboratory. Check the coupon for samples, test data, and suggested stain and blister resistant formulations.

Why don't you make a house test this spring? We will be happy to supply the details if you just return the attached coupon.

Specifications Admerol 75-M

Percent Solids ± 1%	70
Viscosity G-H @ 25°	R-U+
Acid Value Solids	3.6 Max.
Color Gardner '53 Maximum	11
Average Pounds Per Gallon @ 25°C.	7.61

Archer-Daniels-Midland

Other ADM products:

Linseed, Soybean and Marine Oils, Paint Vehicles, Synthetic and Natural Resins, Polyesters, Fatty Acids and Alcohols, Hydrogenated Glycerides, Sperm Oil, Foundry Binders, Industrial Cereals, Vegetable Proteins, Wheat Flour, Dehydrated Alfalfa, Livestock and Poultry Feeds.

ARCHER-DANIELS-MIDLAND CO.
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Please send the following:

Kit for setting up our own blister-resistance tests consisting of:
1. Plans for the blister box
2. Suggested formulations for Aroplaz 1271, 1400, Var 70 and Admerol 75-M
3. Release forms for test house owners

Name_____ Title_____

Firm_____

Address_____

City_____ Zone_____ State_____

CARBIDE and CARBON

E. E. Fogle, vice president, has announced the following appointments:

R. A. Corio has been appointed district manager for the Newark district and **M. R. Kleeman** has been appointed assistant district manager.

B. A. Gustin, Jr. has been appointed district manager for the Boston district. He was formerly district manager for the Charlotte, N. C., district.

R. J. Hughes has been appointed district manager for the Philadelphia district.

J. F. Luther has been appointed district manager for the Charlotte, N. C., district. Formerly, he was district manager for the Albany district.

J. R. Retter has been appointed district manager for the Albany district.

William Samson has been appointed assistant district manager for the Detroit district.

GENERAL ELECTRIC

Dr. E. A. Kern, manager of the silicone products department's engineering section, has announced the following appointments:

Dr. Stuart D. Brewer has been appointed manager of resin product engineering. He formerly headed the analytical and control methods unit.

Dr. Frederick M. Lewis has been appointed manager of advance development. Prior to his new assignment, he was manager of the resin and rubber polymer unit.

Dr. Abbott Pozefsky has been appointed manager of the analytical and control methods unit. He joined the unit in 1953.

Dr. William F. Gilliam has been appointed specialist in technical information exchange. A principal responsibility of the assignment will be the exchange of data and information about silicone production techniques between the silicone products department and its foreign licensees.

CROWN CORK & SEAL

S. V. Tuttas, division manager of sales for the crown and closure division, has announced the establishment of a district sales form of organization within the division. As set up, twelve district sales offices now will handle all sales and service for all the products the division sells.

The district offices, which will be under the direct supervision of **William Fox,** field sales manager, will cover the entire United States except for nine western states which will continue to come under the company's western division.

District sales managers appointed to head up the new offices are: **Don Naylor,** Baltimore; **Rube Wagner,** Chicago; **S. Kriegsman,** Cincinnati; **W. I. Lang,** Dallas; **W. M. Jackson,** Detroit; **H. D. Bloom,** Leeds, Ala.; **K. A. Boss,** New Orleans; **G. B. Dingley,** New York City; **E. P. Stuart,** Orlando, Fla.; **W. F. Kneip, Jr.,** Philadelphia; **V. R. Hoffman,** St. Louis, and **E. L. Brooks, Jr.,** St. Paul, Minn.

GODFREY L. CABOT

Franklin King, Jr., manager, paint industry sales, white pigments division, has announced the appointment of D. H. Litter Co., 60 Cambridge St., Allston, Mass., as sales agent for "Wollastonite" in the New England area. Litter will handle distribution in the states of Maine, New Hampshire, Vermont, Massachusetts and Rhode Island for all industries except rubber, ceramic and paper. They have handled "Wollastonite" sales in the New York area for the past two and one half years.

HEYDEN CHEMICAL

Arthur Minich has been elected a director of the corporation, it was announced by Simon Askin, president. Mr. Minich is a vice president of Heyden and president of Nuodex Products Co., a division of Heyden.

Arthur Minich

He joined Nuodex in 1932 as vice president, was elected vice president in charge of research in 1943, executive vice president in 1951, and president in 1955. In 1955, he was elected vice president of Heyden, in charge of all Nuodex operations.

Boy, did the boss give me an earful about making sure to get FEIN'S PAILS and CANS!

Fein's containers give you *exactly* what you need . . . and you get them exactly when and where you need them. Fein's complete line includes: Steel Pails, Thinner, Varnish and Shellac Cans; 1 Gallon and 1 Quart Triple-Tite Paint Cans.

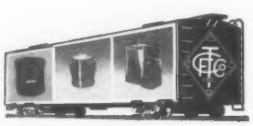
Inquire today about our unique Mixed Carload Shipment Plan.

FACTORIES AND SALES OFFICES:

FEIN'S TIN CAN CO., INC. . . . . Brooklyn, N. Y.
ATLAS CAN CORP. . . . . Brooklyn, N. Y.
PEERLESS CAN CORP. . . . . Brooklyn, N. Y.
COMMERCIAL CAN CORP. . . . . Newark, N.J.
STANDARD CAN CORP. . . . . Pittsburgh, Pa.

SALES OFFICES: Philadelphia, Baltimore, Cleveland, Cincinnati, Boston
The Smith Can Co., Atlanta, Georgia;
Magic City Bottle & Supply, Miami, Fla.

PHOTO-CONSTANCE BANNISTER



PATENTS

Complete copies of any patents or trade-mark registration reported below may be obtained by sending 50c for each copy desired (to foreign countries $1.00 per copy) to the publisher.

Nitrocellulose And a Silico-Alkyd Resin

U. S. Patent 2,742,442. Robert C. Hedlund, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich., a corporation of Michigan.

A composition of matter consisting essentially of (1) 25 to 90 per cent by weight nitrocellulose and (2) 10 to 75 per cent by weight of a silico-alkyd resin, said resin consisting of the reaction product of (*a*) 25 to 90 per cent by weight of an organosilicon compound selected from the group consisting of silanes having the general formula R_nSiX_{4-n} where R is a monovalent hydrocarbon radical, *n* has a value of 1 to 2 inclusive and X is a radical selected from the group consisting of alkoxy, acyloxy, halogen, amino and hydroxyl radicals and partial condensates of said silanes, (*b*) 2.5 to 49 per cent by weight of glycerine (*c*) 5.2 to 62 per cent by weight of a compound selected from the group consisting of dicarboxylic acids, and the anhydrides, alkyl esters and acid chlorides thereof and (*d*) up to 60 per cent by weight of fatty acid having 8 to 20 carbon atoms; there being in the final product from 2 to 30 per cent by weight based on the total weight of (1) and (2) of the reaction residue of the organosilicon component (*a*) the weight of said residue being calculated on the basis of the formula

$$\frac{R_nSiO_{4-n}}{2}$$

where R and *n* are as above defined.

Process of Hardening Varnish Coatings on Leather

U. S. Patent 2,741,566. Ernst Demme, Weinheim an der Bergstrasse, Germany.

In the process for the production of patent leather, in which leather is coated with linseed oil varnish and oven dried to tacky dryness, the improvement which comprises contacting the dried tacky varnish coating with vapors of a diisocyanate capable of reacting with and hardening the coating until only substantially the surface of the coating is hardened to non-tacky dryness.

Acrylonitrile Polymers Stabilized With Certain Alkyl Sulfones

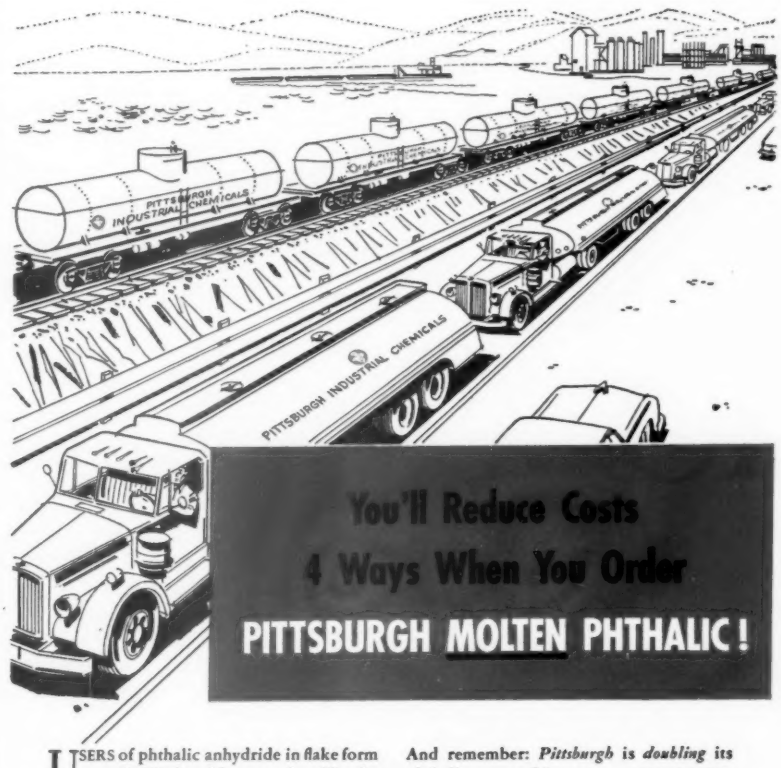
U. S. Patent 2,740,766. George W. Stanton and Forrest A. Ehlers, Walnut Creek, Calif., assignors to The Dow Chemical Company, Midland, Mich., a corporation of Delaware.

A composition of matter the essential constituents of which are a polymeric body containing at least 60 per cent by weight of acrylonitrile polymerized in the polymer molecule, any balance being another monoethylenically unsaturated compound copolymerized with acrylonitrile, and, as a stabilizing agent therefor, from 1 to 20 per cent of an alkyl sulfone in which the alkyl groups are linear, do not individually contain over 4 carbon atoms, and the sum of the carbon atoms in both alkyl groups is from 5 to 8 inclusive.

Method of Applying Luminescent Coatings

U. S. Patent 2,742,376. Simon Larach, New Brunswick, N. J., assignor to Radio Corporation of America, a corporation of Delaware.

A method of coating a surface with powdered luminescent material which comprises: (1) applying to the surface to be coated a suspension comprising a powdered luminescent material having a host crystal consisting essentially of at least one element selected from the group consisting of sulphur and selenium and at least one element selected from the group consisting of zinc and cadmium, a volatile solvent and a resin that will depolymerize into volatile units when heated to between about 100° and 500° C. and (2) heating the coated surface in a gaseous medium



USERS of phthalic anhydride in flake form specify *Pittsburgh* because they like the uniform quality, reliable deliveries and the convenience of *Pittsburgh* "Quick-Open" bags. But if you have facilities for receiving tank truck or tank car shipments of *Pittsburgh* Phthalic Anhydride in *molten* form, you'll enjoy these important cost-saving advantages, too:

1. Lower cost-per-pound.
2. Lower handling costs.
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And remember: *Pittsburgh* is *doubling* its phthalic output this year . . . greater assurance than ever of *prompt* deliveries in *any* quantity when you buy from *basic Pittsburgh!*

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that is inert to said luminescent material to a temperature sufficient to depolymerize the resin.

Styrene Modified Alkyd From 5-Tertiary Butyl Isophthalic Acid

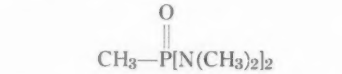
U. S. Patent 2,742,445. Funston G. Lum, Richmond, Calif., assignor to California Research Corporation, San Francisco, Calif., a corporation of Delaware.

In the process of preparing modified unsaturated polyester resins by the copolymerization of styrene with a base resin derived from the polymerization of a poly-hydric alcohol with both an aliphatic alpha, beta ethylenically unsaturated dicarboxylic acid and a benzene dicarboxylic acid, the improvement of increasing the compatibility of the styrene and base resin which comprises employing as the benzene dicarboxylic acid 5-tertiarybutyl isophthalic acid in an amount ranging from about 1 mol for 4 mols of the aliphatic alpha, beta ethylenically unsaturated dicarboxylic acid to 1 mol per mol of the aliphatic alpha, beta ethylenically unsaturated dicarboxylic acid.

Solutions of Polymers of Vinylidene Chloride

U. S. Patent 2,742,444. Harry W. Coover, Jr., and Joseph B. Dickey, Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N. Y., a corporation of New Jersey.

As a new composition of matter, a solution in an organic phosphorous compound of the formula:



$$CH_3—P[N(CH_3)_2]_2$$

of a polymer of vinylidene chloride containing in the polymer molecule at least 95% by weight of vinylidene chloride.

Zirconyl 2-Ethylhexoate

U. S. Patent 2,739,905. Gerry P. Mack, Jackson Heights, and Emery Parker, New York, N. Y., assignors, by mesne assignments, to Carlisle Chemical Works, Inc., Reading, Ohio, a corporation of Ohio.

As a new composition of matter, a mixture comprising manganese 2-ethylhexoate and zirconyl 2-ethylhexoate in a ratio of about 95 to 20 per cent of Mn to about 5 to 80 per cent of Zr, calculated on the metal content by weight.

Modified Melamine-Formaldehyde Resin

U. S. Patent 2,740,736. Curtis Elmer and Thomas Anas, Springfield, and Stuart H. Rider, Longmeadow, Mass., assignors to Monsanto Chemical Company, St. Louis, Mo., a corporation of Delaware.

A co-condensation product of one mol of melamine, from 2 to 4 mols of formaldehyde and from 0.0006 to 0.006 mol of a material taken from the group consisting of ammeline, ammelide, cyanuric acid and mixtures thereof.

Composition For Cleaning And Stripping Paint From Aluminum

U. S. Patent 2,741,599. Louis McDonald, Altadena, and Alfred E. Hawley, Long Beach, Calif., assignors to Kelite Corporation, Los Angeles, Calif., a corporation of California.

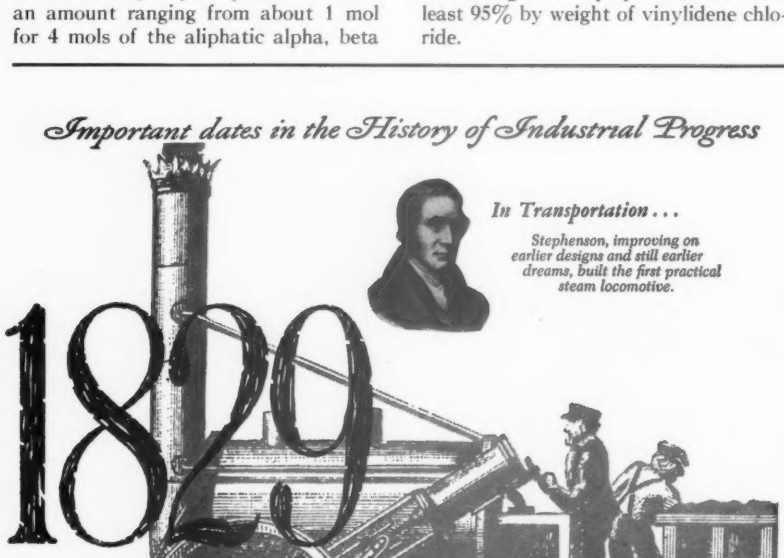
A composition for cleaning and stripping paint from aluminum which composition consists essentially of 80 to 90% sodium activator compounds and silicate corrosion-inhibiting agents providing a mol ratio of Na_2O to SiO_2 of from one mol Na_2O to from 0.9 to 1.1 mols of SiO_2, the SiO_2 content being from 11 to 19%, 2 to 6% of a sequestering agent selected from the group consisting of alkali, amine and ammonia salts of polyhydroxy carboxylic acids, 1 to 5% of a dispersing agent consisting of a polymeric tetramethylene aryl sodium sulfonate wherein the aryl radical is selected from the group consisting of benzene, naphthalene and anthracene, and 3 to 7% of a wetting agent.

Styrene-Modified Polyvinyl Acetate Resins

U. S. Patent 2,741,650. John Charles Lukman and Ora Leon Wheeler, Agawam, Mass., assignors to Shawinigan Resins Corporation, Springfield, Mass., a corporation of Massachusetts.

A heat reaction product in the form of a resin emulsion of a 50-150 parts of a mixture comprising from 60% to 85% polyvinyl acetate and from 40% to 15% styrene, 100 parts of water and 0.5 to 6.0 parts of a water-soluble hydrophilic colloid, reacted at temperatures over 80° C.

Important dates in the History of Industrial Progress



In Transportation . . .

Stephenson, improving on earlier designs and still earlier dreams, built the first practical steam locomotive.

In the history of fats and waxes

GROCO 26 STRIPPED COCONUT FATTY ACIDS

Titre	26° – 29° C.
Color 5¼" Lovibond Red	2.5 max.
Color 5¼" Lovibond Yellow	15 max.
Color Gardner 1933	2 – 4
Unsaponifiable	0.25% – 0.50%
Saponification Value	251 – 258
Acid Value	250 – 257
Iodine Value (WIJS)	7 – 15

Lefevre observed that tallow under the influence of sulfuric acid and supplemented by coconut oil yields fatty acids. Just eight years later, A. Gross & Company began to manufacture fatty acids for industry. Today, the Coconut Fatty Acids made by A. Gross exemplify the high standards of quality which research and modern production techniques have made possible. Shown in the table are specifications for GROCO 26 – STRIPPED COCONUT FATTY ACIDS from which a major portion of the lower acids has been removed.

Send for samples and catalog "Fatty Acids in Modern Industry."

A. GROSS & COMPANY

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Factory: Newark, N. J.

Distributors in Principal Cities

Manufacturers Since 1837

Modification of Coumarone-Indene Resins with Formaldehyde

U. S. Patent 2,740,767. Frederick W. Breuer and Burt F. Hofferth, Manheim Township, Lancaster County, Pa., assignors to Armstrong Cork Company, Lancaster, Pa., a corporation of Pennsylvania.

A process of upgrading coumarone-indene resin having a ring and ball softening point below about 18° C. and a mixed cloud point below 0° C. comprising heating said resin in the presence of a formaldehyde-yielding substance of the group consisting of formaldehyde, paraformaldehyde, methylal, dioxolane, and alpha trioxymethylene and an acid catalyst.

Latex-Aluminous Cement Coating Composition

U. S. Patent 2,742,441. Wilfred J. Mohr, Denville Township, N. J., assignor to The Patent and Licensing Corporation, New York, N. Y., a corporation of Massachusetts.

A coating composition comprising 10 to 20% by weight of a stabilized butadiene-styrene copolymer latex, 20 to 30% by weight of aluminous cement, and 50 to 75% by weight of sand, said latex containing as stabilizers therefor 8 to 12 parts of casein and 4 to 8 parts of an alkyl aryl sulphonate per 100 parts by weight of the butadiene-styrene copolymer in said latex.

Stain and Method of Preparation

U. S. Patent 24,130. Herman R. Nack, Columbus, and William A. Waldie, Delaware, Ohio, assignors to Chadeloid Corporation, Dayton, Ohio, a corporation of Delaware.

As a new product, a staining composition for wood consisting of a metal salt of sodium carboxymethylcellulose, said metal salt being selected from the group consisting of iron sulfate, copper sulfate, and chromium chloride, said metal salt of sodium carboxymethylcellulose being dispersed in tetrahydrofurfuryl alcohol containing sodium hydroxide up to about 1% by weight of said alcohol.

Melamine-Aryl Guanamine Resins

U. S. Patent 2,740,738. Curtis Elmer and Thomas Anas, Springfield, and Stuart H. Rider, Longmeadow, Mass., assignors to Montanto Chemical Company, St. Louis, Mo., a corporation of Delaware.

A co-condensation product of one mol of melamine, from 2 to 5 mols of formaldehyde, from 0.05 to 0.3 mol of a compound taken from the group consisting of aryl and aralkyl guanamines, and from 0.0006 to 0.006 mol of a material taken from the group consisting of ammeline, ammelide, cyanuric acid and mixtures thereof.

Phenol-Terpene and Phenol Aldehyde Combination

U. S. Patent 2,741,651. Jerome Been and Martin M. Grover, Rutherford, N. J., assignors to Rubber and Asbestos Corporation, Bloomfield, N. J., a corporation of New Jersey.

Resinous reaction products formed by heating together a preformed resin formed by reaction of a phenol and a terpene hydrocarbon with a heat-hardening resin formed by reaction of a para-hydrocarbon substituted phenol and an excess of methylene-releasing agent selected from the group consisting of formaldehyde, hexamethylene tetramine, and paraformaldehyde.

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So, let it BOOST SALES

Your name, the integrity of your Company, your manufacturing know-how, all help to sell your product.

Make full use of the prestige you have built by using Vulcan Lithographed Steel Containers. Your name, your trademark, your slogan lithographed in non-mar, permanent-finish, full-colors becomes an EXTRA sales incentive.

Vulcan will reproduce your present trademark or design new ones for you.

All Vulcan pails and Drums (sizes 1 through 20 gallons) are made to standard specifications from quality-steel. Vulcan Hi-bake permanent lining guards the quality of your product.

Vulcan Pails and Drums have been SERVICE-PROVEN FOR HARD-TO-HOLD PRODUCTS!

OVERNIGHT SERVICE. Write or wire for full information and prices.

Vulcan—large enough to fill your Drum and Pail needs—small enough to give you personalized service!

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NEWS

Federation to Sponsor NDSC Paint Short Course

As part of its educational activity, the Federation of Paint and Varnish Production Clubs will sponsor a Paint Short Course for high school chemistry teachers at North Dakota State College from June 19 through 26.

The objective is to acquaint high school chemistry teachers with recent advances in paint technology so that they will be in a better position to advise their students of the opportunities in the paint industry itself. This course, under the guidance of the educational committee, is part of the Federation's over-all program to attract technical and technological personnel to the paint industry.

Each of the Federation's 24 constituent clubs will select one teacher from within its area to attend the special session which will be conducted by Dr. Wouter Bosch, Chairman of the Department of Paints and Varnishes of NDSC.

The subject matter to be presented will acquaint these teachers with the technology of protective coatings without being highly technical. The course will consist of about three hours of lecture per day for each of the six classroom days and three hours work in the laboratories of the college on special experiments. No credit will be given for the course but certificates of completion will be issued.

To date, the high school teachers selected by the constituent clubs to attend the Short Course are as follows: Hilton Welkos, of Patterson Park High School, Baltimore, Md. (Baltimore Club); T. Handley Diehl, of Central High School, Cincinnati, Ohio. (CDIC Club). N. B. Maniaci, of Cleveland, Ohio; (Cleveland Club); C. W. Owens, Jr., of Crozier Technical High School, Dallas, Tex. (Dallas Club); John J. Burke, of George Washington High School, San Francisco, Cal. (Golden Gate Club); Alvin Lee Rogers, of Bellaire Senior High School, Bellaire, Tex. (Houston Club); J. G. Blann, of Manual Arts High School, Los Angeles, Cal. (Los Angeles Club); Linus T. Cassidy, of Holy Cross School, Montreal, Canada. (Montreal Club); John Campbell, of Newton High School, Newton, Mass. (New England Club); Norman W. Sipple, of Washington High School, Portland, Ore. (Pacific Northwest Club); William H. Gregory, Chemistry Supervisor of the Philadelphia Public High Schools, Philadelphia, Pa. (Philadelphia Club); J. Edgar Morris, of Brown High School, Atlanta, Ga. (Southern Club); L.R. Mapes, of St. Louis, Mo. (St. Louis Club); Mrs. Agnes Klock, of Lockport, N. Y. (Western New York Club).

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Nat. Lead Scholarships

A scholarship program in engineering at the University of Toledo has been established by the National Lead Co., New York City. The scholarships are open to high school graduates in the vicinity of Toledo, Ohio; Grand Rapids, Mich.; Pottstown, Pa., and Batavia, N. Y.

Announcement of the program was made jointly by Joseph A. Martino, president of National Lead and Dr. Asa S. Knowles, president of the University of Toledo.

ST. JOE lead-free ZINC OXIDES are available in a complete series of grades for protective coatings. The ores, equipment and procedure used in the production of St. Joe High-Grade Zinc metal of 99.98% purity — and commanding a premium market price — are identical with those used in the production of St. Joe lead-free Zinc Oxides. Quality control is, therefore, one of St. Joe's most important production tools. This, together with prompt deliveries, unequalled and unbiased customer service accounts for their unqualified acceptance by consumers.

For Exterior Finishes:	
MEDIUM HIGH OIL ABSORPTION	Green Label-46
MEDIUM OIL ABSORPTION	Green Label-40
MEDIUM LOW OIL ABSORPTION	Green Label-45
LOW OIL ABSORPTION	Green Label-17
For Interior Finishes:	
HIGH REACTIVITY	Black Label-20
MEDIUM REACTIVITY	Green Label-12
For Mildew Resistant Finishes:	
HIGH HALOGEN TYPES	Green Label-40FR Green Label-17FR

Complete data on all grades, and samples for testing, sent on request. Please specify application.

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NEWS

Note Research Advances At Glidden Conference

New chemical applications, products, production processes and other technological advances in the Glidden Company's five major divisions were reviewed at Glidden's Eighth General Research Conference last month in Wernersville, Pa.

Chairman of the three-day conference was Paul E. Sprague, vice president and chairman of the firm's general research committee. Dwight P. Joyce, Glidden president and board chairman, was keynote speaker. He participated in the sessions along with Dr. William von Fischer, newly-appointed coordinator of research and development, and other company officers and directors.

Papers and demonstrations were provided by selected members of the firm's research staff of each division, operating under Dr. J. P. Bain, technical director, southern chemical division, Jacksonville, Fla.; Dr. B. W. Allan, director of research, chemicals-pigments-metals division, Baltimore, Md.; Dr. J. Wayne Cole, director of research, central organic research laboratory, Chicago, Ill.; E. Schulte technical director, paint division, Cleveland, Ohio, and G. Norman Bruce, chairman of the research committee, Durkee Famous Foods Division, Chicago.

Guest speaker at the conference will be Dr. Ernest Guenther, vice president and technical director of Fritzche Brothers, Inc. The conference concluded with an inspection tour of Glidden's principal eastern division paint plant, the A. Wilhelm Co. at Reading, Pa.

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Pulp Chemical Ass'n Elects Officers

Albert Scharwachter of Arizona Chemical Co., was re-elected president and Richard J. Spitz of Newport Industries, Inc., was elected vice president of the Pulp Chemicals Association at its second annual meeting held recently in New York City.

Mr. Scharwachter and E. J. Calleton, National Southern Products Corp., were elected chairman and vice chairman, respectively, of the tall oil division of the association and Lee A. Radeker Champion Paper & Fibre Co., and E. M. Godat, Crossett Chemical Co., were elected to similar official positions in the sulphate turpentine division.

Dernell Every will continue as secretary treasurer and T. K. Heston as assistant secretary treasurer while Dr. Arthur Pollak remains as technical director and I. B. Oseas as counsel.

The Pulp Chemicals Association was formed in 1955 as a trade association of manufacturers of chemical products produced by or derived from the sulphate wood pulping industry. It was the outgrowth of the Tall Oil Association (now the Tall Oil Division) formed in 1947 to initiate promotional and statistical programs for the tall oil industry.

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Liquid Carbonic Acquires

The Liquid Carbonic Corp. has signed an agreement on an exchange-of-stock basis whereby it acquires Western Oxygen, Inc., Seattle, Wash. according to Rex L. Nicholson, president and chief executive officer of Liquid.

Western Oxygen, an important producer of oxygen, acetylene, and medical gases, also distributes welding equipment and supplies.

. . . the best start for a good finish

When you begin your development work with an R-B-H pigment dispersion, you know you are on equal terms with the best. You can then devote full attention to your formulating problems.

R-B-H . . . *for finishes of integrity.*

R-B-H Dispersions

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DISPERSION TECHNICIANS
BOUND BROOK, NEW JERSEY

Pigment dispersions in nitrocellulose; ethyl cellulose; urea formaldehyde; vinyl and alkyd resins; chlorinated rubber and other plastic binders.

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NEWS

Cargill Announces New Developments

Three new resin products were recently announced by Cargill, Inc., of Minneapolis. The new products, highlighting in particular a new alkyd flat known as "Cargill CAF," were introduced at a sales meeting conducted at Resin Research Laboratories, Inc., Newark, N. J.

Resin Research, an independent laboratory, had been called upon to make a fair and accurate evaluation of these products. Exhaustive tests fully proved the merits of these new materials, according to Cargill.

The company also announced construction of a new research and development laboratory building which will be under the direction of Dr. A. Richard Baldwin. The research center will centralize and coordinate all of Cargill's research activities. Special emphasis will be placed on the development and improvement of products for the paint and varnish industry.

The laboratory includes a protective coatings section, providing facilities for preparation and testing of paints, varnishes and other coatings, in connection with the development and evaluation of new oils. Considerable attention is also given to developing formulations for specific types of finishes, based on oils and oil derivatives produced by Cargill.

Plans were also announced for the immediate construction of a new soybean processing plant to be located on President's Island at Memphis, Tenn. The plant is scheduled to go into actual operation early in 1957.

It will process about 700 tons of soybeans daily, and be able to store 2,200,000 bushels.

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SELECTED: Hilton W. Welkos, chemistry teacher at Patterson Park High School in Baltimore City, has been chosen to represent the Baltimore Paint and Varnish Production Club at the High School Teacher's Paint Seminar. Mr. Welkos was presented with a check for expenses by O. J. Hinz, president of the Baltimore Club.

PPG Scholarship Awards

Ten high school seniors were selected as winners of Pittsburgh Plate Glass Foundation Merit Scholarships, according to a recent announcement by the National Merit Scholarship Corp. of Evanston, Illinois. Average worth of each scholarship is $6,000.

The winners are Gladys M. Brooks, Villanova; William E. Masterson, Jr., Pittsburgh, and Harold J. Myers, Ford City, all of Pennsylvania; Paul M. Burns, Kenedy, and Melvin B. Ocker, Corpus Christi, both of Texas; Michael J. Kindred, Indianola, Iowa; John R. Tyler, Logansport, La.; William W. McKee, Jr., Clarksdale, Miss.; Ben F. Hodge, Jr., Pine Lawn, Mo.; and Richard M. Stevens, Audubon, N. J.

NEWS

Chemical Market Research Award to A. E. Forster

Albert E. Forster, president and chairman of the board of Hercules Powder Co., Wilmington, Del. was named winner of the 1956 Memorial Award of the Chemical Market Research Association for his contributions to market research in the chemical industry.

The award was presented to Mr. Forster at a dinner meeting held last month in the Hotel Biltmore, New York City, at the conclusion of a two-day convention attended by more than 400 members of the Chemical Market Research Association.

Mr. Forster was elected chairman of the board of Hercules in 1956, and has been president since 1953. He now holds both positions and has been a director since 1940.

•

T. J. Peterson, 82, Dies; Tamms Industries Pres.

T. J. Peterson, 82, president of Tamms Industries, Inc., Chicago, died last month at his home in Evanston, Ill.

Mr. Peterson established Tamms Industries, Inc., formerly known as Tamms Silica Co., in 1911 and headed the company in its succeeding 45 years of growth and expansion.

He leaves his wife Marion and a daughter, Helen, of Los Angeles.

•

Chemical Sales Agents

Appointment of two new chemical sales agents in the paint manufacturing industry has been announced by L. W. Reeves, manager of chemical sales for the General Tire & Rubber Co., Akron, Ohio.

The new agents and their territories are: R. L. Ferguson Co., 229 E. Wisconsin Ave., Milwaukee 2, Wis., who will cover eastern Wisconsin; The Truesdale Co., 52 Cambridge St., Allston, Mass., who will cover Maine, New Hampshire, Vermont, Rhode Island, Massachusetts and Connecticut.

Glidden Canadian Lab

The Glidden Co., Cleveland, Ohio has announced that newly-erected laboratory facilities have been opened in Toronto, Canada designed to provide complete technological services to trade sales and industrial paint customers in that country.

Company officials said that personnel of the new facility will work with the Glidden Canadian sales staff on all coating problems.

•

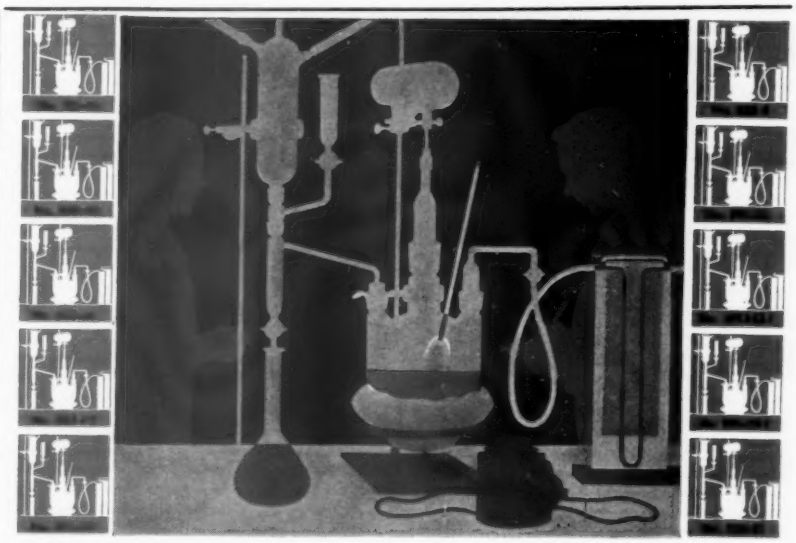
Expand G. E. Silicone Dept.

Acquisition of over 60 acres of land adjacent to the silicone products department of the General Electric Co. at Waterford, N. Y. has been announced by Dr. Charles E. Reed, general manager of the department. The land will provide adequate room for an orderly, planned expansion of production, research, and administration facilities to meet increasing industrial and consumer demands for silicones.

•

Nat. Starch Scholarships

Frank Greenwall, president of National Starch Products Inc., has announced the company's continuation on a broader basis of its scholarship program in chemistry and chemical engineering. The schools involved are Columbia University, Case Institute of Technology, The University of Nebraska, North Carolina State College, Syracuse University (N. Y. State School of Forestry), and Rutgers.



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NEWS

Paint Industry Lag Cited by Gen. Battley

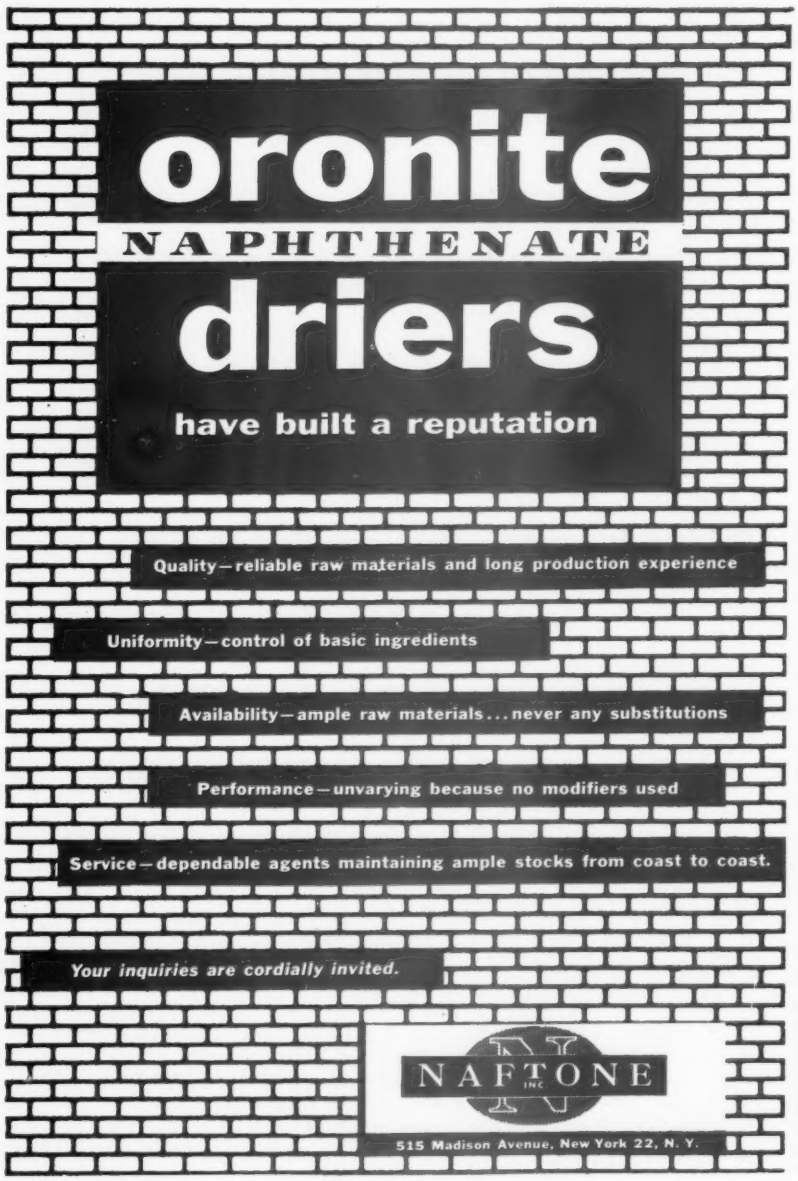
Although 1955 was history's biggest boom year, paint industry production was hardly higher than it was ten years before when most civilian construction was frozen because of wartime restrictions. This was the dominant thought in an address by General Joseph F. Battley, president, National Paint, Varnish and Lacquer Association, given last month before the Atlanta Paint, Varnish and Lacquer Association.

Gen. Battley conceded that the industry cannot point out with certainty the conditions that are mildly at fault as against the major causes that underlie the low sales volume figure.

For a starter, he suggested that the industry might explore the interesting idea that one reason for the frozen volume figure is that the product has become so good that less of it is going farther.

"There are other fields where research would probably show that our efficiency is cutting down our volume," he said. "The new flow-coating technique may be a factor."

However, he asserted, even if it is demonstrated that the product gives more mileage, "I don't suggest for a minute that we can rest on our oars. The developments of research are coming so fast nowadays that no one should assume that he can count on his present markets five years ahead. When you consider that almost all the development in synthetics and plastics have occurred in the last twenty years, it is almost impossible to guess what technology will do in the next twenty."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R. C. Quortrup, Barrett Official, Dies at 57

Richmond C. Quortrup, 57, assistant manager of the chemical sales department of Barrett Division, Allied Chemical & Dye Corp., died May 25 in Manhasset, N. Y.

R. C. Quortrup

Mr. Quortrup spent his entire business career with Barrett, starting as an office boy in 1917. He worked subsequently in traffic and accounting, and came to the chemical sales department in 1922. In 1935 he was made assistant manager of the department, a position he held until illness forced his retirement.

Mr. Quortrup was a member of the Association of the American Chemical Industry, and the Chemical Specialties Manufacturing Association.

K. C.-St. Louis Meeting

The seventh annual joint meeting of the Kansas City-St. Louis Paint and Varnish Production Clubs was held June 1 and 2 at the Coronado Hotel in St. Louis.

Among those who took part in the program were M. A. Glaser, Midland Industrial Finishes Co. and president elect of the Paint and Varnish Production Clubs, who moderated a penel discussion; Dr. A. C. Elm, research supervisor of the New Jersey Zinc Co., who spoke on "The Re-evaluation of the Function of Pigments in Paints"; Clovis Adams, director of auxiliares research of the Sherwin-Williams Co., and N. J. Timmons, research department, Rohm and Haas Co.

LATEX FILM

(*From page 40*)

increase the tensile strength of the dried films.

It was apparent that there was a decided difference in the average particle size of the various latices, with styrene-butadiene showing the finest particles, acrylics being intermediate in particle size, and PVA latex showing the largest particles. It was also demonstrated that thoroughly dried latex films can be broken down into the original latex particles if they are allowed contact with water for some time.

Paints based on the previously listed emulsion systems, formulated in a PV range of 15 to 55 per cent, were exposed up to eight months at the National Lead Co. exposure station at Sayville, L. I. Changes of film properties with time of exposure were noted and Mr. Dunn presented data on water permeability, water sorption, water solubility, swelling, blister resistance, tensile strength, per cent elongation and gloss.

Latex paint film may be formulated to give a wide range of physical properties, but it appears that a PV range of 30-35 per cent is generally best for optimum performance out doors. If the PV is increased, water permeability increases while tensile strength, elongation, and gloss decrease. It would seem that the incorporation of mica in the formulation of these paints confers some beneficial effects. All emulsion systems tested showed promise in blister resistant performance.

Another feature of the meeting was the showing of, "The Ninth Element," a film dealing with the processing of titanium dioxide from ore to finished pigment.

New members elected at this meeting were—Class A: Saul Mark, Central Paint and Varnish, and C. Rowland, H. Yuska, R. E. Moran, and H. Neumann, all of Interchemical Corp. Class B: P. Tudder, Columbian Carbon Co.

ADVANCE COURSE

(*From page 41*)

MacGuffie, manager, technical service department, Titanium Pigment Corp., New York City.

July 23—"The Modern Approach to Dispersion," Charles E. Kew, president, Kinetic Dispersion Corp., Buffalo, N.Y.; "Polyester Resin for Fibers, Foams, Finishes and Fabrication," C. J. Meeske, director of resin research, Reichhold Chemicals Inc., Detroit; "Production and Functional Use of Extender Pigments," Si R. Mountsier, Jr., technical service department, Whittaker, Clark and Daniels, Inc., New York City.

July 24—"Microorganisms and Paints," Dr. Stan J. Buckman, president, Buckman Laboratories, Inc., Memphis, Tenn.; "Anti-corrosive Coatings," H. L. Beakes, Kentucky Color and Chemical Co., Louisville.

July 25—"Lacquers," Dr. Bosch and Herman G. Philips, Jr., technical sales representative, cellulose products department, Hercules Powder Co., Wilmington, Del.

July 26—"Colors and Their Use," Dr. Willard F. Spengeman, manager of technical sales, pigments department, E. I. duPont de Nemours and Co., Inc., Wilmington, Del.; "Paint Research at N.D.A.C.; Past, Present, Future," Dr. Bosch.

July 27—"Literature; the Federation and the Association," Dr. Bosch; "Questions and Possible Answers," Moderators: Dr. Bosch and guest lecturers.

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abstracts

Abstracts of Papers which were read at the Annual 1955 meeting of the Paint and Finishes Section of the German Chemical Society at Stuttgart. Important points raised in the verbal discussions to these papers are incorporated.

Catalysis of the Auto-Oxidation Of Unsaturated Fatty Acid Esters

By W. Kern.

In order to understand the film formation of drying oils it is necessary to investigate the elementary processes of this complex reaction. A study was made of the auto-oxidation of linoleic acid methyl ester which was prepared as pure as possible (methylene-isolated double linkages), and of recinene acid methyl ester (conjugated double linkages). The spontaneous auto-oxidation of the linoleic acid methyl ester about which a report had previously been made, is an auto-catalytic procedure. The kinetics show that the speed of the auto-oxidation is proportional to the oxygen absorption, thus the concentration of the primary formed hydroperoxyde rises. The experimentally found relationship can be deduced with simple assumptions which stand in agreement with the alpha-methylene mechanism of the auto-oxidation.

The catalysis of the auto oxidation with benzoyl peroxide (Bolland) and with azo-diisobutyrnitrile can be described by the assumption of a monomolecular formation of radicles, which act as chain-loosening. From the catalysis of the auto-oxidation with hydroperoxides,on the other hand, conclusions must be drawn of a bi-molecular dissociation of the hydroperoxides. It was shown that the auto-catalysis of the spontaneous auto-oxidation obeys the same relationship as the catalysis through hydroperoxides. From this, it was concluded that the auto-catalyzer of the spontaneous auto-oxidation is a hydro-peroxide. One has approached closely identifying the auto-catalyzing hydroperoxide with the hydroperoxide of the linoleic acid ester isolated by American authors.

The catalysis of the auto-oxidation of linoleic acid methyl ester with the aid of metal compounds (Cu^{++}, Fe^{+++}) shows that these metal compounds activate neither the molecular oxygen nor the linoleic acid ester but that they accelerate the radical building from the hydroperoxide of the linoleic acid ester; the autocatalysis is merely increased. In agreement with this result, the same metal compounds activate only the radical dissociation of hydroperoxides and per-acids, not, however, of dialkylperoxides and diacylperoxides. Thus, the auto-oxidation of linoleic acid ester can be accelerated particularly well with metal compounds in combination with hydroperoxides. The mechanism of this catalysis was discussed.

From the results obtained there occurs the further possibility of achieving strong catalytic effects with the auto-oxidation with the aid of the Redox systems and metal Redox systems.

The investigation of a conjugated-unsaturated fatty acid ester is considerably more difficult than that of an isolated—unsaturated fatty acid ester because the purity of the ester is not easy to attain. As no hydroperoxides, but polymer peroxides are formed, there are marked differences compared with the auto-oxidation of isolated—

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unsaturated ester, and in fact, both with the kinetics of the spontaneous auto-oxidation as with the metal catalysis

The equations for the reaction speeds can first be calculated as are to be expected with mono-and bimolecular reactions respectively. By the comparison of these values with the actually obtained reaction velocities, the author was able to establish the auto-oxidation of the linoleic acid methyl ester as a bimolecular reaction. This establishment was specially tested by a series of experiments by which the oxidation of the linoleic acid methyl ester was additionally catalyzed by materials whose reaction scheme was known. The autocatalysis of the ester was then always overshadowed by the catalysis of the additions; exterpolation to the start of the reaction, then gave the desired conclusions. In this connection, the author mentioned also deviating results with investigations on conjugated linoleic acid which had shown a primary action of this order and it could accordingly be suspected that here a polymeric peroxide is formed.

The question of how such a bimolecular reaction is to be explained could perhaps be answered by reference to the relationship of hydroperoxides and hydrogen peroxide. Hydrogen peroxide is simultaneously both a reducing and an oxidizing agent. As a reducing agent it reacts bimolecularly and one must accordingly regard the catalyzing hydroperoxide as a reducing agent. Regarding the catalysis by metal compounds, the various assumptions for the action (1) of metal peroxides (2) of complex formations (3) by activation of the substrata peroxides are to-day still debatable. The behavior of the metal compounds in their highest oxidation stages speaks, however, for the activation. Thus, the radical formation from the hydroperoxide, and, with this, a further proof for the hydroperoxide character of the auto-catalyzater.

The very difficult problems of an investigation of this nature were indicated. Today it is still not possible to obtain pure the individual cis-trans-isomers of the linoleic acid, and, with each isomer one must reckon on a deviating behavior. With previous work on this subject, no clearcut conclusions were obtained and the oxidation processes could not clearly be researched, on account of the complications of the aggregate systems present.

Thus, research has progressed from the initial investigation of the pigmented systems to the non-pigmented and then to pure triglycerides. Now, research is being conducted on the pure esters. Clearcut research on the oxida-

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tion processes is only possible if one is dealing with pure, defined compounds. However, even with the present work, the last degree of purity has not yet been attained, for as is known, a linoleic acid ester exists in four different, stereo-isomeric forms: trans-trans, trans-cis, cis-trans, cis-cis. We do not know yet how these differences act. It is not possible at the moment to investigate more closely, because it is difficult to obtain even only a couple of grams of a pure linoleic acid from 10 - 20 kg. of an oil.

The question was asked as to what conclusions could be drawn from the auto-oxidation of the fatty acid ester to that of a triglyceride. The answer was that it is very difficult to investigate a triglyceride by the above methods, because gelation occurs soon after the beginning of the reaction; then one is no longer in position to establish whether oxygen is present in excess and a falsification of the results would occur. This is the reason why an ester was investigated in the above work, which does not gelatinate but is present as monomer. In the beginning, also, no polymerization product is formed.

Vinyl Polymers For Corrosion Protection Finishes

By G. Mueller.

Significant characteristics of the polymers used as film formers are determined by the nature and distribution of the substituents in the monomers. The author showed tables in which the monomers which have been researched up to now and are technically available were represented beside their characteristics and application possibilities. It follows from the structure as to whether a vinyl resin can be introduced, firstly as a rigid material, secondly as a film as well as flame-sprayed for lining vessels, and thirdly as a lacquer finish film-forming agent for corrosion protection.

As a film-forming agent for corrosion-protective lacquers they are entering more and more into use; mixed polymers on the basis of vinyl chloride (85-90%) / vinyl acetate (5-15%) which in part, contain groups still capable of reaction. These resins show strong light absorption in the wave length range of 250-270 m. microns. Testing in ultro-violet light accordingly brings no findings which allow of conclusions on the behavior of the resins in sunlight. Results which can be evaluated can be obtained with the Light-fastness tester developed by Hoffmann.

With the use of bright, short-wave light-reflecting as well as stabilizing-acting pigments, corrosion-protective lacquers can be prepared which give coatings resistant to sea water as well as to the weather. Stoving lacquers can also be produced which are capable of reaction in combination with other heat-hardening resins. An intermediate lacquering with unsaponifiable mixed polymer creates a sure bonding between wash primer (polyvinyl butyral basis) and cover coatings, which contain vinyl chloride/vinyl acetate resins as the bonding agent. Mixed polymer containing free carboxyl groups react with basic pigments, which causes a thickening on storage of the lacquers. For certain cases, this reaction capability is utilized for the production of coatings which are resistant to solvents.

In the discussion, further questions were asked regarding the pigmentation of the vinyl polymer finishes, concerning the application of inorganic and organic pigments and concerning the purity of the pigments used. The following pigment ratio was given by Dr. Mueller: About two parts of bonding agent with one part of pigment. Antimony oxide acts as very stabilizing. The number of coatings amounts to two. The durability externally is about four years. Pigmentation with aluminium is very durable and this has been confirmed with American tests. The film thickness is given by the number of coatings. The pigment consists of nine parts of titanium dioxide and one part of antimony oxide. The formulation of the finish is about 18 parts of bonding agent, 69 parts of solvent and 10 parts of pigment, as well as some plasticizer.

Extensive tests were made by the German Chemischem Werke Huels paintworks with polyvinyl dispersion finishes on its own building construction

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work. With this, there was used a pigmentation of 1:4-1:5 with zinc oxide for the first coat and 1:1 to 1:5 for the second coat. The adhesion was found to be satisfactory on sand-blasted steel surfaces but unsatisfactory on smooth surfaces. For such purposes, a malic acid containing product is more suitable. A type compatible with red lead must be used.

The activity of the pigment is also very important with dispersions. The activity should not, however, be so far suppressed that the pigment becomes practically inactive. Otherwise, a considerable characteristic would be lost.

As will be seen, this paper was concerned particularly with mixed polymers of vinyl acetate and vinyl chloride, partially with the co-use of malic acid. Such a product satisfies requirements as regards adhesion to the metal subsurface, resistance to heat, light, moisture and chemicals, and resistance to moisture permeability and pigment compatibility considerably better than individual substances which do actually show a better behavior in any single characteristic, but completely fail, in other respects.

The author instanced the suitability of vinyl resins, for example Hostalite CAM, for ships finishes, from the keel to the underwater finish and above the water line up to the upper deck coating. Such finishes are also particularly suitable for the internal lacquering of food pack cans, washing machines, refrigerators, etc.

Practical Experience With Dispersion Paints, Finishes

By W. Leuser.

In practice, for the most part, four types of dispersion paints have proved themselves: Vinylpolymerizates (polyvinyl acetate and polyvinyl acrylate); Synthetic Rubber (termed Latex paints); Alkyd resins; Oils.

The above mentioned types of dispersion paints have varying characteristics as regards formulation, working and application. These characteristics were discussed in detail. Then the paper discussed the suitability of the various dispersion paints for finishes on brickwork, mortar, wood and metal, and details were given to questions regarding suitable pretreatment of the finish sub-surface, of the coating thicknesses as well as of the number of individual coats which could be applied one on top of the other.

The various application possibilities were indicated with consideration of the more recent practical experience and the questions of durability were discussed, particularly with external finishes. Dispersion paints on the basis of polyvinyl acrylates would appear to be particularly satisfactory for exterior finishes.

With the investigation of finish defects, the satisfactory identification of dispersion finishes is often necessary. A simple iodine test has been found for dispersion paints and finishes on the basis of vinylpolymerizates which permits dispersion finishes of this type to be recognized, even in film cross-sections.

It is necessary to differentiate between the class of fluid-in-fluid (emulsion paints) and solid-in fluid (suspension paints). With the latte group there is also to be differentiated the classes of synthetic and rubber latices respectively. Perhaps one of the most important properties of the dispersion finishes is their characteristics of being water-repellant and yet making possible the application on a moist sub-surface.

•

New Du Pont Rubber Lab

Marking its 34th year of activity in the field of rubber, the Du Pont Co. last month officially opened its new product development and technical service Elastomers Laboratory in Wilmington, Del.

Designed primarily to provide technical service on neoprene, "Hypalon" synthetic rubber, "Hylene" organic isocyanates, and rubber chemicals, the laboratory can duplicate on a pilot-plant scale many operations in rubber manufacture.

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ATTEND DISCUSSION: Sidney B. Levinson, technical director of the D. H. Litter Co., New York City, and Frank Ritter, chief, protective coatings laboratory of the Nuodex Products Co., Elizabeth, N.J., presented a talk recently on "Additives." Both men addressed the supervisory technical personnel of the Socony Paint Products Co., Metuchen, N.J. Mr. Levinson covered the functions of additives in general and Mr. Ritter described Nuodex products in particular. The following Socony representatives attended: Edwin M. Oswald, Dr. Paul L. Lotz, William J. Greco, Robert Brown, Fred N. MacGregor, Edwin Saul, Jr., William S. Stoy, and Fred S. Wilson.

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Color, APHA	10 Maximum
(10 gm. in 100 ml. methanol)	
Turbidity, ppm SiO_2— APHA standard	30 Maximum
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CALENDAR OF EVENTS

June 17-22. ASTM 59th Annual Meeting, Chalfonte-Haddon Hall, Atlantic City, N. J.

Aug. 13-15. Joint Convention of American Soybean Assoc. and National Soybean Processors Assoc., Univ. of Illinois, Urbana, Ill.

Sept. 16-21. American Chemical Society Meeting, Atlantic City, N. J.

Sept. 24-26. American Oil Chemists' Society Fall Meeting, Sherman Hotel, Chicago, Ill.

Production Club Meetings

Baltimore, 2nd Friday, Park Plaza Hotel.

Chicago, 1st Monday, Furniture Mart.

C.D.I.C., 2nd Monday.
Cincinnati — Oct., Dec., Mar., May, Hotel Alms.
Dayton — Nov., Feb., April, Suttmilers.
Indianapolis — Sept., Claypoll Hotel.
Columbus — Jan., June, Fort Hayes Hotel.

Cleveland, 3rd Friday, Harvey Restaurant.

Dallas, 1st Thursday after 2nd Monday, Melrose Hotel.

Detroit, 4th Tuesday, Rachham Building.

Golden Gate, 3rd Monday, E. Jardin Restaurant, San Francisco.

Houston, 2nd Tuesday, Bill Williams Restaurant.

Kansas City, 2nd Thursday, Pickwick Hotel.

Los Angeles, 2nd Wednesday, Scully's Cafe.

Louisville, 3rd Wednesday, Seelbach Hotel.

New England, 3rd Thursday, University Club, Boston.

New York, 1st Thursday, Brass Rail, 100 Park Ave.

Northwestern, 1st Friday, St. Paul Town and Country Club.

Pacific Northwest, Annual Meetings Only.

Philadelphia, 3rd Wednesday, Philadelphia Rifle Club.

Pittsburgh, 1st Monday, Gateway Plaza, Bldg. 2.

Rocky Mountain, 2nd Wesnesday.

St. Louis, 3rd Tuesday, Kings-Way Hotel.

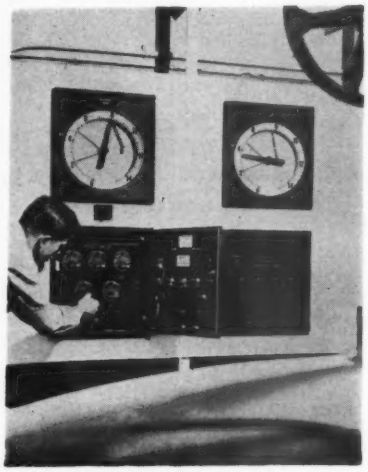
Southern, Annual Meetings Only.

Toronto, 3rd Monday, Oak Room, Union Station.

Western New York, 1st Monday 40-8 Club Buffalo.

AUTOMATIC BATCHING

(*From page 39*)



Courtesy of Baldwin-Lima-Hamilton Corp.

Instrumentation for automatic formulation includes and indicator-recorder-controller and also a separate mixing timer system for each mixing tank. Each control system is set up to prepare two batches of different composition. The selection of a batch is accomplished by a two-position switch.

Although the operation of each mixing tank provides for automatic proportioning of four ingredients, these materials are actually mixed in two different batches: three of the major ingredients in one batch and two in the other. The instrumentation is set up to handle either batch automatically as determined by a two-position switch. The major ingredients in one batch are water, a resin and pulverized clay. The other batch is a mixture of water and latex plus small quantities of other ingredients. Small quantities of seven other ingredients of the two mixes are added manually. These total only about five percent of the total mix and vary in quantity from four gallons to 68 pounds.

Preparation of a batch is started by pressing a "Start" button. A valve in the water line then opens and water flows into the mixing tank until the load cells signal the controller that the proper weight is in the tank. The water valve then closes automatically and two further actions take place simultaneously. The valve in the resin line opens and the mixer starts. Mixing is done by a vertical, motor-driven shaft with vanes at the bottom. Mixing action is automatically stopped before the resin flow is stopped in order to prevent churning action from affecting the weight measurement of the resin being added.

When the resin line valve closes, two actions take place simultaneously again. This time the conveyor starts feeding pulverized clay into the tank and the mixing action resumes. Again the mixer is automatically stopped while the clay continues to flow into the tank. When the load cells indicate that enough clay has been added, the conveyor is stopped automatically and mixing is started again. At this point the electrical circuit controlling the discharge valve is opened in such a way that the valve cannot be opened while the mixer is running. After a 30-minute mixing cycle the mixer stops and a signal lamp is lighted. The discharge valve is manually opened to discharge the completed mix by gravity into a storage tank below. Electrical interlocks prevent the start button from actuating the equipment again until the discharge valve is closed after the tank has been emptied.

Batch 2, consisting of a mixture of water and latex with other ingredients in minor quantities, is prepared similarly. Normally the two batches are mixed in different tanks but each tank and instrumentation system is set up to produce both batches. Separate timers are used for each timed mixing action.

Accuracy of all ingredient proportions is held within one-half percent. All liquid ingredients flow through 2-in. pipes and the clay flow on an enclosed conveyor is at the rate of about 5.5 lb. per second. Weights being measured range from about 3000 lb. for the empty tank to about 18,000 lb. with the largest batch.

The system is designed to stop and start again at the same point in the event of a power failure, continuing the cycle from the stopping point after a short warm-up of the instrument. Another limit switch prevents actuation of all

NITROMETHANE CH_3NO_2

NITROETHANE $CH_3CH_2NO_2$

1-NITROPROPANE $CH_3CH_2CH_2NO_2$

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control points while the tank is being discharged and tank weight is falling past the points of normal actuation. After the "completed" lamp is lighted, the cycle cannot be repeated until the tank has been discharged, the discharge valve closed, and the start button pushed.

The system is arranged in such a way as to permit manual operation also. Each feed line has a meter to indicate the volume of material flowing into the tanks. Figures indicated by the flow meters are compared with quantities measured by weight.

The use of automatic batching in the production of SuperSanitas contrasts greatly with methods used in making this fabric wall covering during the past 43 years since its introduction. During the first 40 years, when the coating material was made with linseed oil, quality control required manual production in 50-gallon batches under laboratory control for each batch. When the latex type coating was introduced batch quantities were increased to 400 gallons and ingredients were still measured manually by weight on platform scales. As quantities were increased and more efficient production methods developed, it was found advantageous to meter some of the liquid ingredients directly into the batch tank. Since the production of larger batches improved both the efficiency of production and the uniformity of the product, still bigger batches were found to be desirable.

Accordingly the system offeres a simple means of handling the larger bulk and fluid requirements, retaining the repeatability of measurement required for product uniformity, and providing a method to proportion automatically.

•

Evans Research Expands Facilities

An overall expansion program has been announced by Evans Research and Development Corp., chemical consultants with main offices in New York City. An increase in research personnel, expanded laboratory space, and new research tools are included.

Added to its basic chemical research equipment has been a double-beam recording infra-red spectrophotometer, and two types of gas chromatography equipment. In expanding the plastics department, new heat distortion, tensile testing, and heavy duty mixing equipment has been added. The physics department now has under construction an instrument of new design for measurement of surface energies.

New equipment has been added to the facilities of the food department's test kitchen. A new laboratory isolated from the main laboratories has been acquired for the flavor department's odor library and its flavor compounding. The cosmetic department has enlarged and modernized its three experimental beauty shops.

•

New "Plextone" Agents

Maas & Waldstein Co., Newark, N. J., Chicago and Los Angeles, producers of multicolored paints, has announced the appointment of the following distributors for its color-flecked, textured, one-coat enamel, "Plextone":

The Jones & Porter Paint Mfg. Co., 1403 N. Cedar, Spokane, Wash.; Youngstown "Plextone" Distributing Co., 532 Mehlo Lane, Youngstown 9, Ohio, and the Nevada Auto Supply Co., 1595 E. 2 St., Reno, Nev.

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Airco Company International, New York

TECHNICAL Bulletins

MIN. & CHEMICALS CORP.

In step with its occupation of new administrative offices and research center at Menlo Park, N.J., Minerals & Chemicals Corporation of America has published a 16-page brochure entitled "Meet Minerals & Chemicals Corporation of America.

The booklet explains the origin and formation of the company and its three wholly-owned subsidiaries. Separate sections tell a "mine-to-finished-product" story of the firm's operations in kaolin, Attapulgite, limestone and bauxite—the basic non-metallic minerals from which its products are made.

Also included are notable applications for M&C materials, a listing and professional resume of the men who manage and direct the company, a roster of distributors, and coverage of new Menlo Park facilities.

FATTY ACIDS' CHEMISTRY

A 48-page booklet called "The Chemistry of Fatty Acids has been published by the Chemical Div., Armour and Co., 1355 W. 31 St., Chicago 9, Ill.

Composition of fats and oils is reviewed in the booklet, as are sources and chemical makeup of fatty acids. The preparation, characteristics and applications of these acids are outlined and a section is devoted to the handling of fatty acids in shipment, storage and use. Also included is a reference guide to test methods and analytical procedures, along with an explanation of terms used.

LATEX PAINT MODIFIER

All the desirable properties of "Piccopale A-1 Emulsion," a quality-improving modifier for rubber-base paints, are briefly discussed in a new Picco bulletin page recently published by the Pennsylvania Industrial Chemical Corp., Clairton, Pa. Ten outstanding properties are shown in the bulletin to give latex paints sales advantages that appeal to buyers of both industrial paints and shelf goods.

NON-IONIC EMULSIFIER

"Witco 31," a general-purpose, non-ionic emulsifier, is described in a new technical bulletin issued by Witco Chemical Co., 122 E. 42 St., New York 17, N.Y.

According to the bulletin, the material has a high degree of surface activity and disperses readily in water and in many organic solvents. It is an emulsifier for fats, oils, some waxes and similar products generally forming oil-in-water mixtures. It also can be used to incorporate butyl stearate in concrete mixes to provide water repellency. The bulletin gives complete specifications, properties and packaging information.

HEATERS, HEATING DEVICES

The 1956 catalog of General Electric heaters and heating devices, bulletin GEC-1005G, contains application index, calculating data, specifications, operating information, and list prices of standard G-E heaters and heating devices. Included are immersion, strip, cartridge, tubular, fin, and railroad switch heaters; unit heaters, soldering irons, glue pots, soft-metal melting pots, oven equipment, and control. Process and application index shows methods of heating and type of heater recommended for various heating processes. The 60-page catalog is available from General Electric Co., Schenectady 5, N. Y.

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NON-CLOG PUMPS

Bulletin 121-A describing its complete line of non-clog pumps for handling solids in suspension has been issued by Aurora Pump Division, The New York Air Brake Co., 619 Loucks Ave., Aurora, Ill.

The eight-page illustrated booklet covers the entire line of pumps of this class manufactured by the company. Included are vertical, horizontal and close-coupled types. Along with descriptions are proposed specifications for the use of architects and engineers.

CHEMICAL CATALOG

Catalog 120-C, the 1956 Fisher Chemical Index, lists over 7,300 chemicals that are commercially available and of use to science—plus bacteriological culture media, fluidextracts, spiritis and tinctures.

The handy 370-page reference book, available free of charge to laboratories, gives structural formulas, formula weights, melting and boiling points, and color index numbers. Available from Fisher Scientific Co., 384 Forbes St., Pittsburgh 19, Pa.

EXPENDABLE PALLETS

The National Wooden Pallet Manufacturers Association, 609 Barr Building, Washington 6, D.C., has published a technical pamphlet entitled, "What You Should Know About Expendable Pallets." This publication is intended as a guide to pallet purchasers in determining the important principles involved in the construction and use of wooden expendable pallets.

The pamphlet includes data on the types of expendable pallets, construction standards for pallet parts and fastenings, and allowable tolerances. It also provides an Application Rule for the use of expendable pallets, and a list of definitions and terms.

EAGLE-PICHER STORY

A 48-page booklet, "Picture Book of Eagle-Picher: Its People, and Products," has been published by the Eagle-Picher Advertising Dept., American Building, Cincinnati 1, Ohio.

It presents an up-to-the-minute word and picture story of the diversified operations of the company.

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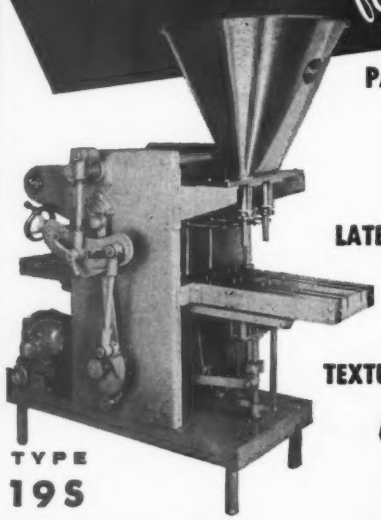
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INTERMEDIATES

Heyden Chemical Corp., 342 Madison Ave., New York 17, N.Y., has issued two new technical bulletins on intermediates.

The booklet on "Paraformaldehyde" summerizes the importance of this chemical in the synthetic resin industry, where it is used in cold setting resorcinol-formaldehyde adhexives.

"Hexamethylenetetramine," described in the other bulletin, has especially important uses in the synthetic resin industry as a curing agent for phenolic resins.

ANTIOXIDANT D

"Antioxidant D for Odorless Paints, Enamels and Lacquers" is the subject of Technical Bulletin I-18 released by National Aniline Div., Allied Chemical & Dye Corp., 40 Rector St., New York 6, N. Y.

The four page bulletin contains physical properties, covers suggested formulation methods and quantities to be used in odorless paints, varnishes and pigment inks. It also contains a valuable performance table that shows the relative effectiveness of Antioxidant D in various paint systems and in comparison with National Anti-Oxidant B and National ASA.

MIXING EQUIPMENT

Mooney Machine Mfg. Co., 4923 E. Slauson Ave., Maywood, Cal., has available a folder describing and illustrating some of its mixing equipment. Included are the Master Mixers: 80-150 and 200-350 gallon net capacity, Master Blending Tanks, Post Agitators, and The V. H. (Vari-Speed and Hydraulic Lift) Mixer.

LABORATORY HOMOGENIZER

The Gaulin Laboratory Homogenizer, specially designed for research, pilot plant or limited production operations is covered in a four-page folder, LH-55, released by the Manton-Gaulin Manufacturing Co., 44 Garden St., Everett 49, Mass.

Starting with a brief "Theory of Homogenization," the literature describes the operation of the laboratory-sized unit, covers representative types of products which can be processed and gives details on the special Gaulin homogenizing valve.

CATIONIC CHEMICALS

The properties, application and advantages of cationic chemicals in flotation are described in a new booklet prepared by the Chemical Division, Armour and Company, 1355 W. 31 St., Chicago 9, Ill.

Called "Mineral Flotation with Armour Cationic Chemicals," the brochure contains the latest fundamental data available on the subject, plus data developed by Armour during the past two decades. Topics include a review of the principle of cationic flotation, chemicals used, conditions needed for successful flotation and the advantages inherent in cationic chemicals.

Data on Armour flotation collectors is arranged in easily read tables in the booklet. In addition, a listing of technical services and literature available on the subject is given.

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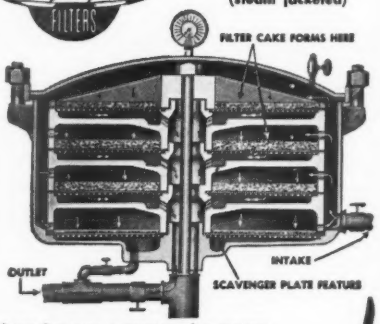

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ACRYLONITRILE

(*From page 34*)

$r_1 \times r_2$ approaches 0, then the structure will approach regular alternation of monomer units. Values of $r_1 \times r_2$ greater than unity are seldom, if ever, found (22).

A partial list of monomers whose reactivity ratios have been determined for copolymerization with acrylonitrile is presented in Table IX.

Comonomer (M_2)	r_1	r_2
Butadiene (15)	0.0 ±0.04	0.35 ±0.08
Chloroprene (15)	0.01 ±0.01	6.07 ±0.53
Isoprene (15)	0.03 ±0.03	0.45 ±0.05
α-Methylstyrene (13)	0.06 ±0.02	0.1 ±0.02
Methyl acrylate (1) 30°C.	0.67 ±0.1	0.26 ±0.1
Vinylidene Chloride (19)	0.91 ±0.1	0.37 ±0.1
Maleic Anhydride (21)	6	0

Table IX. Monomer reactivity ratios for copolymerization with acrylonitrile (M_1) at 60 deg. C. unless otherwise noted.

Summary

Acrylonitrile imparts improved film properties to surface coating compositions. The major improvements are:

1. Increased hardness and toughness
2. Better mineral spirits (tolerance) resistance
3. Higher tensile strength
4. Shortened drying times
5. Low elongation
6. Decreased water absorption
7. Practically no saponification

These properties combine to make acrylonitrile a most valuable tool for research chemists in their quest for ever better protective and decorative surface coatings.

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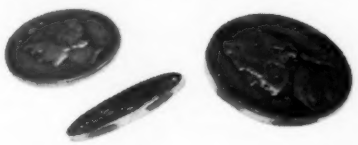

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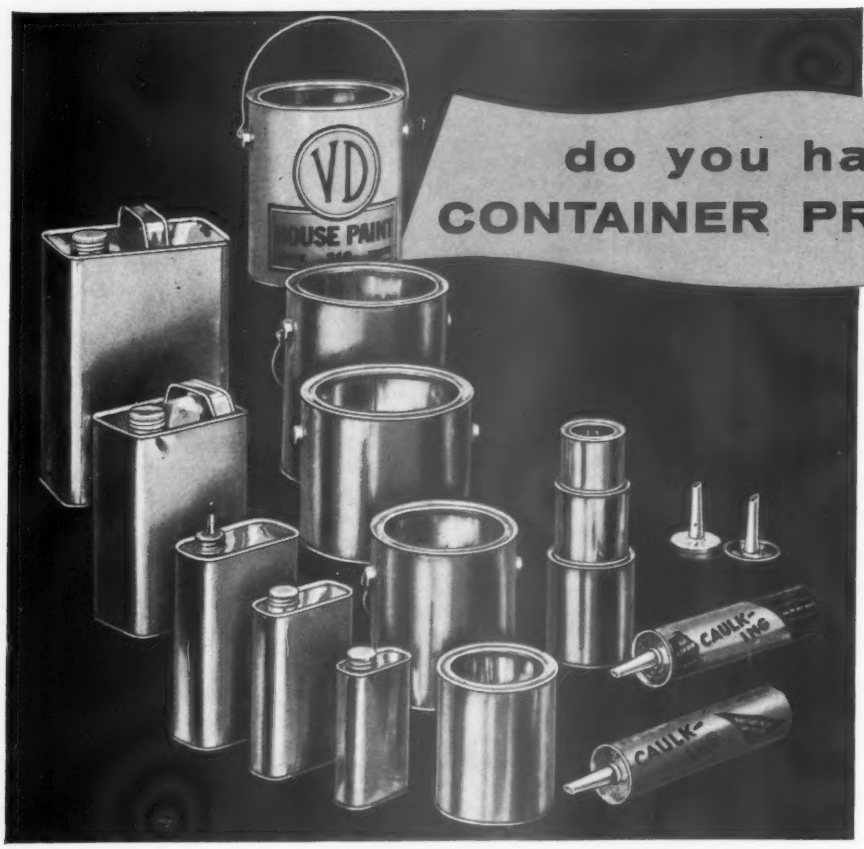

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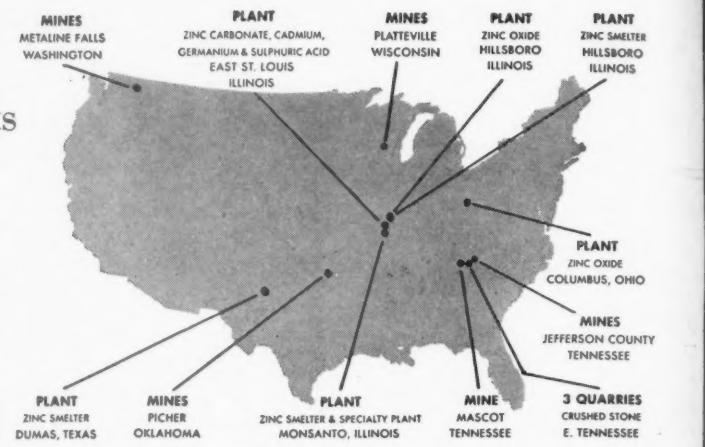

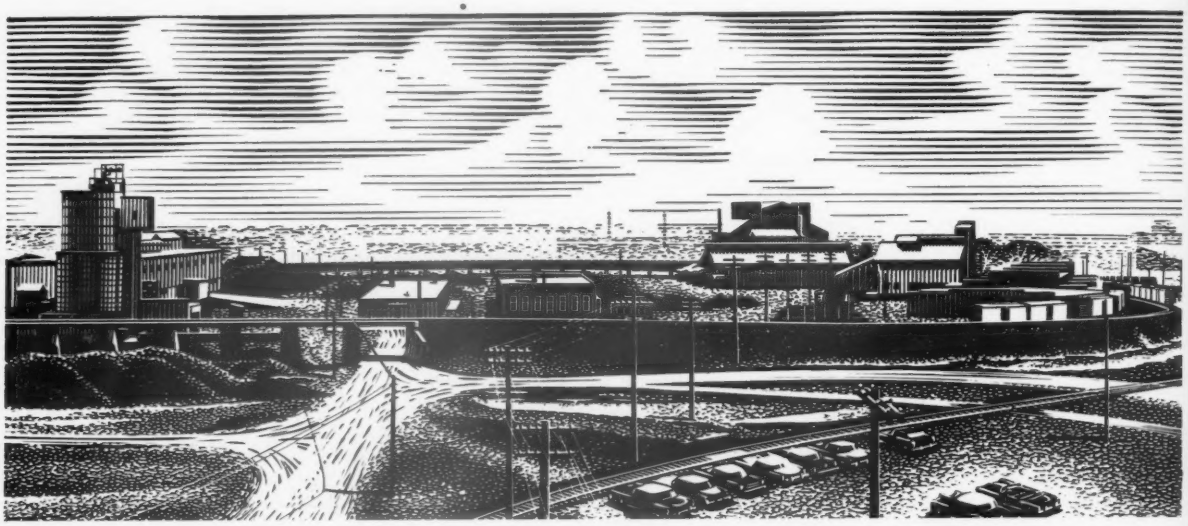

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